THE IRON AGE

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Greater Output by Plant Rearrangement

Alloy Steel Units Moved into New Combinations—Considerable Equipment Added—New Boiler House

EXTENSIVE improvements and rearrangement of rolling mill equipment have been made at the plant of the United Alloy Steel Corporation, Canton, Ohio, during the past year, with the view of increasing the output and saving in labor and consequently reducing production costs. With these changes the company has been able to increase its production with the same mill previously used and with a considerable reduction in its operating force.

Important improvements through the rearrangement of the equipment have been made at the South Works, formerly the plant of the Canton Sheet Steel Co. This plant has a 32-in. three-high sheet bar mill driven by a 1500-hp. motor that formerly was used to roll sheet bars from 14 x 15-in. ingots down to standard foot weights. In parallel line with this mill in an adjoining building was the "cross country" type of 18-in. mill having four stands. This was used for rolling sheet bars and automobile rim sections. This mill has been dismantled and moved to the lower end of the 32-in. mill building. The new arrangement makes it possible to rough down ingots in larger sizes, as 15 x 16 in. weighing 2940 lb., on the 32-in. mill without overloading the motor and to give the material six additional passes in the 18-in. mill stands.

The latter mill is arranged with high-pressure sprays for the removal of scale from the sheet bar and also is so arranged that the steel can be held between the leader and the finishing pass for the proper cooling, in order to produce the finished surface required in automobile body and other high-finish sheets.

After leaving the finishing stand of the 18-in. mill, the sheet bar passes through a water [illegible] 40 ft. long, to cool the finished sheet bar to below the scaling tem-

In the New Boiler House, Showing the Larry, Stokers and Extension Hoppers Over the Stokers

perature. It is then transferred, broadside, to a runout table so arranged that bars returned toward the 18-in. mill are cut in multiple lengths on a United Engineering & Foundry Co. multiple bar shear having capacity for cutting six 8 x 1¾-in. sheet bars per stroke. The bars so cut are then transferred to the old 18-in. mill building, which has been converted into a sheet bar shipping building. From here the bars are delivered onto narrow-gage buggies and go to the South Division sheet mill or are loaded directly into standard-gage railroad cars, to be taken to the sheet mills of the Berger division, located a few miles away.

If 30-ft. lengths are required, the bars after leaving the 18-in. mill are delivered from the runout table back toward the 32-in. mill end of the building, where they are sheared into 30-ft. lengths and are transferred over a broadside transfer into the finishing mill building, where they are loaded by a bar piler into crane lifts and the overhead crane places them on a beam type cooling bed.

The mill as rearranged is designed for the production of high-grade finished sheet bars and also to produce round, square and flat bars direct from the ingot to the finished bar without reheating. With the rearrangement of the mill equipment and combining the mill stands in one operating unit, the mill has been operated for two 10-hr. turns at the rate of 22,000 tons per month. However, it is not expected that its present average capacity would exceed 16,000 to 17,000 tons per month.

Combining Two Mills to Get Bigger Tonnage

Another important change has been the combining of the Lamberton and 20-in. mills into one unit at the company's A plant. This change, which was described in THE IRON AGE, Oct. 22, consists of the addition of four two-high stands of 20-in. rolls so arranged as to relieve the Lamberton mill of four passes, the latter now being used as a roughing stand. With the new line-up the capacity of the two units now combined into one was increased from 7500 to 12,000 per month and the increased capacity required the addition of another heating furnace.

This increased capacity brought up the problem of handling the increased output. The steel formerly was finished and shipped from the lower end of the Lamberton mill building, but the greater output necessitated increased handling and finishing facilities. These were provided in the old 20-in. mill building, to which the steel now is transferred on narrow-gage transfer buggies after being rolled. It is finished and shipped in this building.

New Equipment in the Alloy Division

Various additions have been made to Plant B of the alloy division. One set of four-hole standard soaking pits has been erected in connection with the 35-in. blooming mill in that plant. These were built by the S. R. Smythe Co., Pittsburgh. One four-hole preheating pit fired by coke oven gas has been provided, also. In case the soaking pits are filled, the ingots are placed temporarily in the preheater instead of on the bank, where they would cool off. An independent stripper building has been erected, to which a Morgan inverted stripper has been moved. A 20-ton pit crane has been erected in this building to handle inverted molds from the ingot buggy to the inverted stripper. A motor-driven cleaning car has been provided for cleaning the hot tops of the inverted ingots. The crane, inverted stripper and hot-top cleaning car were built by the Alliance Machine Co. An additional standard 10-ft. Morgan gas producer has been erected in the gas house.

The recent additions to the plant include a rough bar finishing building, 90 x 360 ft. Formerly this finishing was done in two or three different places but, with the erection of this building, this work has been centralized. All material that is heat treated goes through this department. Bars are conveyed from the heat-treating department on a 10-ton electric transfer car, from which they are handled in the bar finishing building by two 10-ton Alliance overhead electric traveling cranes.

The work in this department is principally straightening heat-treated material and cutting it to length. The equipment includes four Abramsen bar straighteners for straightening material, covering a range of from ¼ to 2½ in. in diameter, six Brightman straightening machines with capacity up to 1¼ in. in diameter in heat-treated material and 1½ in. in annealed material, one machine which was built by the company, with a capacity for straightening material 2 to 5 in. in diameter and three crackers for cutting alloy steel to length. The crackers were built by the Standard Engineering Co.

Boiler Plant Changes

One of the first steps to effect economies was made in the blast furnace boiler plant. Before the changes were made there were seven 768-hp. Babcock & Wilcox boilers equipped with gas burners and Parsons grates. These were hand fired with 4500 tons of solid fuel per month, this fuel supplementing the blast furnace gas. The coke and ashes were handled by hand, this work requiring 26 men on each 8-hr. turn. At the same time two 3000-kw. turbo-generators were standing idle because of lack of boiler capacity. One 7500-kw. turbo-generator was in operation, carrying an overload of practically 800 kw.

In providing an efficient and economical boiler plant a new boiler house was erected and equipped with four boilers, duplicates of those used in the old plant. This boiler house is a brick and steel building, 52 x 120 ft. The firing floor is 25 ft. 8 in. above the yard level and the front ends of the boilers are set 20 ft. above this level.

Each boiler has an ash hopper with a 24-hr. capacity. The ashes are delivered directly from the hoppers into standard-gage railroad cars. The fan room, on the ground level, is separated from the boiler room by a brick wall.

Three of the boilers are provided with Sanford-Riley underfeed stokers for burning coal. The fourth boiler is equipped with an S. R. Harrington type chain stoker arranged to burn coke breeze alone or a mixture of coal and breeze. The Harrington stoker is equipped with suspended arches supplied by the American Arch Co. The boilers are encased in buff faced brick, which gives the boiler house a neat appearance. The four boilers are connected through a single breeching into the radial brick stack, 13 ft. in diameter at the top and 225 ft. in height.

The coal-handling equipment consists of outside storage bins and crusher, one bin holding 250 tons of coal and the other 90 tons of breeze. Coal is fed from the main storage bins to various extension hoppers over the stokers by means of a 2-ton weigh larry, which distributes the fuel to the boilers as needed. An important feature of the extension hoppers is that they are large enough to contain coal for a 4-hr. run at 200 per cent of boiler rating. With the handling equipment and its arrangement more than the usual amount of open space and light is provided in the boiler house.

The boiler house is completely equipped with automatic regulators of improved types. The boilers, superheaters and breeching were supplied by the Babcock & Wilcox Co., the boiler feed and circulating pumps by the Allis-Chalmers Co., the stack by the M. W. Kellogg Co., the coal, ash and soot handling equipment by the R. H. Beaumont Co., the combustion control by George J. Hagan Co., the draft recording gages by the Bailey Meter Co., the recording thermometer by the Foxboro Co., the steam and water piping and blow off tank by the M. J. Daugherty Co. and the turbo-fans by the B. F. Sturtevant Co.

Blast Furnace Capacity Increased

The capacity of the company's blast furnace was materially increased this year by the enlargement of the hearth, the diameter of which was increased from 17 ft. 3 in. to 18 ft. 4 in. when the furnace was shut down for relining. At the same time a number of minor improvements and changes were made. Materials for the new hearth and bosh and four new downcomers were supplied by the W. B. Pollock Co. and a Berg automatic mud gun was supplied by the E. E. Brosius Co.

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Production Has Been Increased by Combining the 32-In. Mill in the Foreground with the 18-In. Mill That Appears in the Background. The ingot is converted into high-gra de sheet bars for automobile body and other highly finished sheets, and also into round, square and flat bars without reheating

The Lamberton Mill Has Been Combined in One Unit with the 20-In. Mill and Four Two-High Stands of 20-In. Mills Have Been Added, So Arranged That the Lamberton Mill Now Is Used as a Roughing Stand and Is Relieved of Four Passes. This shows the lower end of the Lamberton mill, three of the two-high stands, the cooling bed and the hot saw arrangement

The furnace in its last operation, for a period of 1149 days up to its blowing out on June 24 last, produced an average of 550 tons of pig iron per day. The rebuilt stack was started in September after a shutdown of 96 days and since resuming operations has produced an average of 625 tons of pig iron per day. An elevator has been built in a tube extended to the top of the furnace, for handling supplies. A 250-ton Dwight-Lloyd sintering plant now being built is expected to be ready for operation before the end of the year.

Motor Truck Service Replaces Local Freight Train

Using a motor truck and trailer to replace a local freight hauling less-than-carload lots between Ithaca and Geneva, N. Y., the Lehigh Valley Railroad has effected a saving of $3,900 per month, or more than 80 per cent of the former cost of the service, according to a report issued by the National Automobile Chamber of Commerce. The cost of the train each month was given as $4,816, of which $1,520 represented engine and train crew, $1,652 locomotive repairs, $1,552 fuel, oil and water and $92 miscellaneous items. Against this the contract cost of the truck and trailer was $900, or $36 per day, including insurance against loss and damage.

The truck is operated on a schedule, its movements being governed by the train dispatcher. Damage to shipments is reported much less than formerly, when small consignments were knocked about by frequent jerking stops of the freight cars.

Another experiment which the Lehigh Railroad has been making is the substitution of a 40-passenger rail motor coach for a train between Plainfield and Perth Amboy, N. J. Two men have replaced the five men on the train. The experiment has been running for a year and is reported to have paid for itself.

Lead Smelting and Refining Gains

Twenty establishments engaged in the smelting and refining of lead turned out products in 1923 amounting to $227,735,149, according to figures of the Census Bureau. This compares with $150,593,779 from 23 establishments in 1921. The number of wage earners increased from 4509 to 6194 and their wages from $5,957,961 to $8,767,924. Horsepower used in 1923 was 42,377, while the coal consumed amounted to 211,301 net tons. Of the 20 establishments in 1923 only four were engaged in both smelting and refining. Thirteen did smelting only and three refining only. The 20 were distributed over 13 States.

CONDITIONS IMPROVING

Increased Demand for Employees in Nearly All Pennsylvania Centers

HARRISBURG, PA., Dec. 22.—Reports on employment conditions in the iron and steel trade from most districts of Pennsylvania are optimistic, according to the semi-monthly review of conditions presented to R. H. Lansburgh, Secretary of Labor and Industry. Several of the districts are slightly pessimistic.

Johnstown reports a continued increase in production in steel mills, with the Bethlehem Steel Co. plant operating about 80 per cent of capacity as compared with from 35 to 40 per cent operation in July. The addition of modern steel mill machinery and the erection of new mills is reported continuing.

In the Harrisburg district, a steady improvement is reported. The Bethlehem Steel Co. plant at Steelton is reported calling for machinists and machine hands for the first time in ten months. It is understood that this plant will soon place another blast furnace in operation. The Harrisburg Pipe & Pipe Bending Works has also been adding employees, while the Central Iron & Steel Co. has been adding colored labor. The Middletown Car Co. plant has been seeking machinists, machine hands, axle turners, and pipe fitters.

Pittsburgh reports indicate an "upturn." There have been some openings for steel billet chippers and some heaters. Williamsport reports the demand for iron and steel workers in the ascendancy, although the supply and demand just now are virtually balanced.

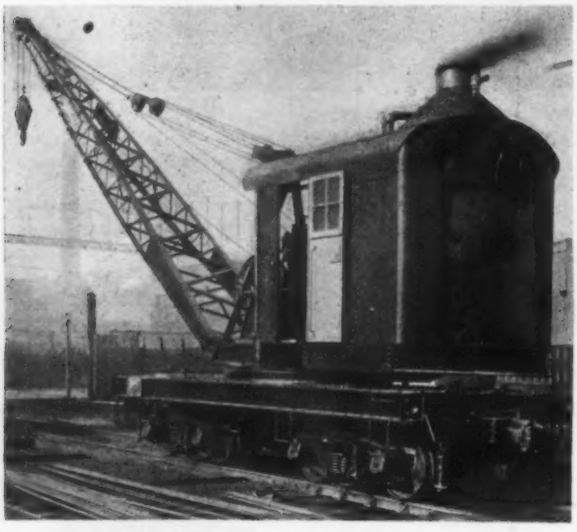
Philadelphia reports a pronounced demand for milling machine men. The Navy Yard is again in the market for acetylene burners for demolishing battleships. The General Electric Co. is reported to be asking for a few journeymen machinists and milling machine operators. Oil City has experienced an improvement. The largest plant in the district has returned to full time operation, while conditions in other plants are said to have been bettered.

The Reading Tube Works, according to the Reading report, has closed one of its furnaces for repairs, but the workmen have been transferred to other departments, thereby working double shift. Hardware manufacturers report active condition, with virtually all departments operating at capacity. Stove foundries are working full time. Conditions in foundries, including brass foundries, are active. Machine shops are working about 70 per cent of capacity.

In the Scranton district, the Delaware, Lackawanna & Western Railroad boilermakers have called off a strike of three years standing, but the company is replacing the men only as openings develop. Seventy men are affected. Allentown is slightly pessimistic, although work in the foundries is better. DuBois finds conditions bad, with the railroads laying off men from the repair shops for three weeks. Erie advises that it has experienced a decided slump. A few men have been released, with indications that they will be rehired some time in January. Lancaster has experienced no change from the rushed condition of the report of two weeks ago. Room is reported for some expert machinists.

Improves Locomotive Crane

An improved model of its No. 4, 20-ton capacity, locomotive crane has been placed on the market by the Brown Hoisting Machinery Co., Cleveland. The high boom hitch, wide truck frame, large diameter rotating ring and the contour of the cab are among changes in the crane, which is shown in the accompanying illustration. The improvements incorporated are intended to provide greater capacities and higher daily output.



High Boom Hitch, Wide Truck Frame and Large Diameter Rotating Ring Are Among Improved Features

The crab has been simplified by the elimination of one shaft, making the remaining parts much more accessible. The drums are independently driven and free running, with outside band clutches. The worm gear boom hoist runs in an oil bath and this, with the high boom hitch, is intended to facilitate booming with loads.

What is regarded as an innovation in locomotive crane construction is the special wide truck frame with a center sill running the entire length, to which are fastened the friction-type draft gearings. The wide truck-frame is said to permit the use of an extra large rotating ring, which materially adds to the stability of the crane. The load rollers that support the revolving superstructure are larger and are arranged so that they may be removed from above without jacking up the superstructure. The vertical rotating shaft may be removed also from above.

The counterweight device for retrieving the tag line and electric cable in grab bucket and magnet work has been discarded, and replaced by a compact arrangement. The main hoist shaft is extended through the crab far enough to accomomodate a small drum and "niggerhead," the latter being keyed to the shaft. The small drum, upon which the tag line of electric cable is wound, is rotatably mounted on the shaft and is driven by the "niggerhead" through a slip friction device.

Austin Co. Will Buy Material

Greatly increased activity in the industrial construction field during 1925 is expected by the Austin Co., Cleveland, engineer and builder, which will shortly begin to place orders for a large amount of material for 1925 requirements. The purchases to be made include 10,000 tons of structural steel, plates and bars, 30,000 tons of fabricating steel for buildings, 7000 tons of reinforcing steel, 12,000 sq. ft. of steel rolling doors, 1,400,000 sq. ft. of steel sash, 43,000 lineal ft. of mechanical sash operating devices and 1500 tons of metal roofing and siding. The total value of the material to be purchased is estimated at $7,000,000.

The Austin Co. is enlarging its steel fabricating shop at Euclid, Ohio, the capacity of which will be increased over 100 per cent. A 10-ton traveling crane will be installed. The company will purchase a large amount of equipment during 1925 for its offices which maintain construction equipment departments.

Construction is in progress on a new wire and rod unit at the Sparrows Point, Md., property of the Bethlehem Steel Corporation, for the production of rods and complete line of wire products, including plain and galvanized wire, wire fencing, nails, etc. It is estimated that the plant will have a capacity of 120,000 tons annually and will employ a force of about 600 men.

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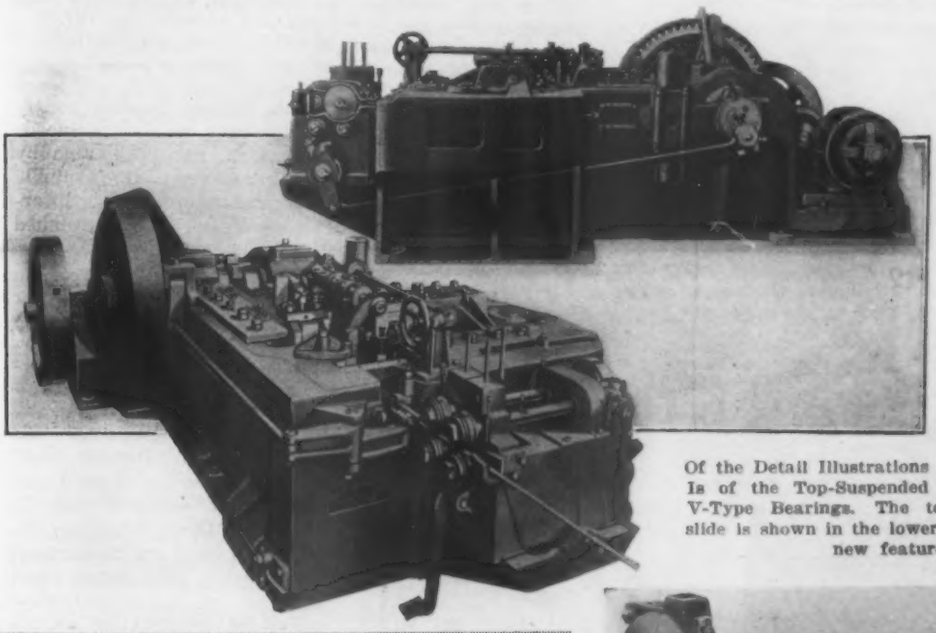
CONTINUOUS MOTION HEADER

Moving Parts Reduced—Adjustments Simplified—Design of Headerslide and Die Slide Features

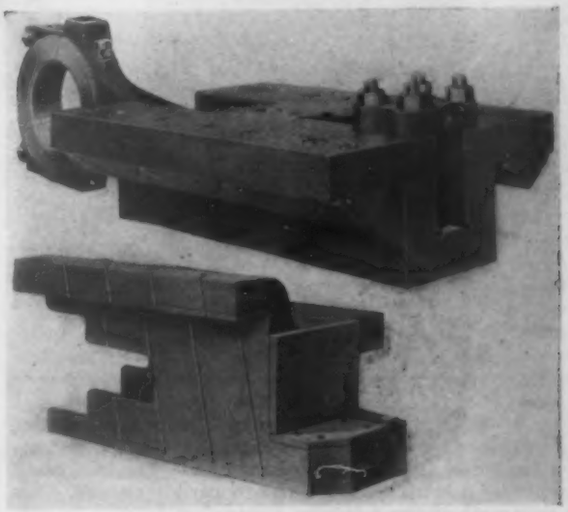
Simplicity and sturdiness were objectives in designing the heavy-duty continuous motion heading machine illustrated, which is intended for use in the manufacture of rivets and bolts.

Several improvements have been incorporated and the machine is heavier and more powerful than former units offered by the builder, the Ajax Mfg. Co., Cleveland. The number of moving parts has been minimized and adjustments have been reduced. The general arrangement has been improved by transferring the die slide operating mechanism from the left to the right-hand side, which permits the operator to feed the stock, watch the quality of the product as it comes through the discharge port on the left and adjust the stock gage from one position. The left-hand side of the machine is clear, which facilitates the setting of dies and tools. These changes, it is stated, have resulted in an increase in production and an improvement in the quality of the product.



Automatic Roll Feed Heavy-Duty Continuous-Motion Heading Machine. The view at the lower left shows the position from which the operator has complete control. The arrangement of the adjustable crank pin, feed rod, ratchet arm and roll housing may be noted from the upper view

Of the Detail Illustrations Below, the Upper Is of the Top-Suspended Headerslide with V-Type Bearings. The top suspended die slide is shown in the lower view. There are new features



The machine may be equipped either with automatic roll feed, as illustrated, or with hand feed. With the roll feed bars in mill lengths are started into the rolls from the heating furnace in front of the machine, and the rolls feed the stock into the machine. A piece is produced on each revolution and the output ranges from 30,000 to 50,000 pieces in 10 hr., depending on the sizes and lengths of the pieces. With the hand feed the capacity of the machine ranges from 14,000 to 18,000 pieces in 10 hr.

The automatic roll feed mechanism is operated from an adjustable crank pin at the end of the crankshaft. The eccentricity of this pin is changed by means of an adjusting screw so that the rolls feed the amount of stock required to produce a bolt or rivet in any given length. The gears of this mechanism are inclosed in the feed housing. The ratchet arm is fitted with two dogs, staggered to give refinement of feed. The feed rolls consist of rings with grooved circumferences to suit the various sizes of stocks. The rolls are mounted in holders on the roll shafts and may be conveniently changed and adjusted laterally for different shear center distances. The roll pressure is controlled by removable weights mounted on the bearings of the upper roll shaft. The feed can be stopped and locked out by depressing a foot pedal. The distance between the feed rolls and backing plate is made adjustable in order to reduce waste from crop ends.

A new feature is that the headerslide, which is unusually long, is top suspended from V-type bearings to keep it in alinement. The trough ways of the bed in which the headerslide bearings operate are above the scale line. They are roll lubricated from two reservoirs and drained at the front, so that good lubrication with clean oil is maintained. The bearings on the headerslide and the ways in the bed are removable for realinement.

Another outstanding feature is that the die slide is top suspended from plain bronze face bearings. It is long and has liberal side bearing areas to keep it in alinement. A wedge liner on the crankshaft side is adjustable to take up wear so as to assure the square shearing of the stock.

The machine has a heavy steel bed of the ribbed type with continuous housings for the crankshaft bearings and deep sections and liberal flanges for rigidity. All wearing surfaces are bushed and lined so that there is no wear of moving parts on the bed proper. Solid sleeve-type crankshaft bearings phosphor bronze bushed are fitted into the bed housings. The crankshaft is a steel forging of the single throw two-main bearing type with cylindrical cheeks and large journal and eccentric pin diameters. The toggle pins are of alloy steel.

A self-adjusted side arm relief of the die slide actuating mechanism is intended to protect the machine in case a bolt or rivet is caught between the faces and the dies. The breast plate is a heavy steel forging with a large rectangular cutter holder which takes the direct wear of the dies. The rectangular cutter has

semi-circular cutting grooves on two edges. The ejector is of the walking beam type operated from an adjustable cam on the inside of the flywheel. The stock gage can be adjusted by the hand wheel while the machine is running, permitting quick adjustments for variations in the diameter of the stock. The cam on the headerslide which actuates this gage is adjustable to change the timing for different shear center distances. Three types of gage arms are furnished for making short, medium and long rivets. The die blocks are machined with four grooves, two in each vertical face, which, it is pointed out, is an improvement over dies with one groove in each of the four faces. The tool holders are of the extension type. There is an adjusting wedge back of the tool holder for fine adjustment.

Four sizes of the machine, from ¾ to 1½ in., are available for producing rivets or bolts at the usual forging temperatures of 1500 to 1800 deg. Fahr. When operating on stock below the scaling temperature, commonly known as semi-hot, it is stated that the machine is capable of heading work up to three-quarters of its rated capacity. The machines may be driven by belt from a countershaft or direct by motor, through a safety friction clutch coupling. In the direct motor drive machine the main bed casting is extended to the rear to carry the pinion shaft and motor. Speeds recommended are 500 to 1200 r.p.m. for variable speed motor and 850 r.p.m. for constant speed motor. Sizes of motors range from 7½ hp. for the ¾ in. hand feed machine up to 30 hp. for the 1½ in. automatic feed machine. Strokes of the machine range from 55 to 125 per min., depending on the size of machine and type and kind of motor.

New Polishing and Buffing Machine

An electrically driven two-spindle polishing and buffing machine, the general arrangement of which will be recognized as differing from the usual machine of this class, is shown in the accompanying illustration.

The base of the machine, which has been brought out by the P. A. Geier Co., Cleveland, is of heavy box section type construction and houses the motor, idlers and the brake mechanism, as well as the control box.

Polisher and Buffer with Motor Mounted on a Sub-Base Within the Machine. The motor may be adjusted up and down to compensate for belt stretch

The motor is of the squirrel cage type and is mounted on a sub-base which permits the hanging of the motor on the internal front side of the base. The base itself is provided with slots located to permit up and down adjustment of the motor to compensate for the stretching of the endless belts that drive the spindles. The belt idlers are mounted on annular ball bearings and are operated by a counterweight for engagement. These idlers with the counterweight are in turn operated by a hand lever, located on the outside of the machine. In this way either spindle may be started or stopped at the will of the operator. This external hand lever also operates a toggle brake which stops the spindles and at the same time locks them for the purpose of changing wheels. The brake is of generous proportion and has Raybestos lining.

The spindle head is of one-piece, cast-iron construction, to assure proper alinement. The spindles of steel are 2¼ in. in diameter and are mounted on large annular bearings. The spindles and bearings are kept dust proof by a system of dust baffles, which arrangement is intended to eliminate the use of felt washers. The spindle housing is inclosed in a sheet metal hood, as shown.

The electrical control is inclosed in a separate case fitted within the body of the machine and is dust proof. Power is controlled by push buttons located conveniently on the upper part of the base, as shown. Speeds ranging from 1800 to 3000 r.p.m. are obtainable by using driving pulleys of varying sizes. One spindle may be operated at one speed and the other at a different speed, if desired. The machine can be furnished with 5, 7½ and 10-hp. motors.

The South's Development

Commemorating 50 years of Southern progress, and at the same time 50 years of editorial work on behalf of the South by Richard Hathaway Edmonds, editor and president *Manufacturers' Record*, Baltimore, a splendid volume of 668 pages entitled "The South's Development" has just been issued. The *Manufacturers' Record* was started by Mr. Edmonds 42 years ago and ever since its beginning its theme has been Southern interests, resources and development. It has been an unswerving advocate and exponent of the South as a great asset to the nation.

The present volume is full of information on all phases of the development and industry of the South. It considers not only the many products one by one and traces their development, but it takes up the States and some of the important cities and shows how they have prospered. There are authoritative articles by experts in their respective fields and the wealth of statistical material is almost bewildering. The illustrations are numerous and the entire book reflects great credit upon both the publishers and the printers.

X-Rays at Detroit Foundrymen's Meeting

At a meeting of the Detroit Foundrymen's Association, held in Ann Arbor, Mich., Thursday, Dec. 11, Dr. Ancel St. John, consulting physicist of New York, delivered a lecture on the "Industrial Use of the X-Ray." He explained the structure and operating theory of the X-ray tube, illustrating his talk with slides, depicting the more or less familiar work of the Watertown Arsenal on steel castings. Supplementing this, Dr. St. John displayed radiographic results of work recently completed, illustrating the method of radiographing successfully small metal parts, a process hitherto indifferently successful, due to the glare from the varied surfaces under the ray. The result was a clear cut radiograph. At a special exhibition defects in castings 1 in. thick were clearly shown.

Union scales of wages and hours of labor of about 895,000 members of organized trades in 66 of the principal cities of the United States show the hourly union wage rate on May 15, 1924, higher than in any preceding year. It was 8.3 per cent higher than on the same date in 1923, 99.8 per cent higher than in 1917, 128.1 per cent higher than in 1913, 141.5 per cent higher than in 1910, and 154.2 per cent higher than in 1907. Weekly rates show the same relative increases, although they have not increased to so great an extent as hourly rates, owing to reductions in the hours of labor.

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HORIZONTAL BALING PRESS

May Be Located on Floor or in Shallow Pit—Moving Cylinders and Stationary Rams a Feature

A horizontal press for baling ordinary steel scrap up to 1/16 in. thick, the finished bale being 10 x 10 x 16 in. and weighing approximately 115 lb., has been brought out by The Hydraulic Press Mfg. Co., Mount Gilead, Ohio.

The press, the general arrangement of which may be noted from the accompanying illustration, is designed so that it can be located on the floor or in a comparatively shallow pit, the top of the baling box being at the floor level. This is made possible by having both rams operate horizontally. Heavily ribbed open-hearth steel castings are used for the side, ends and bottom of the baling box, these members being secured to each other by tie rods and also by dovetail joints in the castings themselves, which is said to provide extremely sturdy construction. The cover is a heavy, ribbed steel casting, and the box as well as cover is lined with renewable steel plates. The moving cylinders are faced with renewable steel plates, which are accurately machined to a close sliding fit with the sides of the box. The thrust is taken by heavy forged steel rods, secured to steel resistance heads.

Mounted on top of each high-pressure hydraulic cylinder is a low pressure cylinder for connection to air pressure or low water pressure, the purpose of which is to return the main hydraulic cylinders to their initial or out position. The piston rod of one of these cylinders, at the left in the illustration, is secured to the sliding cover of the baling box. The cover, after being pulled off the box, engages with the hydraulic ram of the cylinder underneath it, which returns it to its outer position.

Pressure for the main hydraulic rams is supplied by a high and low-pressure pump, selected for its capacity to produce the required output of finished bales in a given period of time. The application and exhaust of pressure from the two operating cylinders is controlled by two simple three-way poppet operating valves conveniently located at one point. At the same point also are located the two plug cocks for the low pressure cylinders, shown at the left in the illustration.

A distinctive feature of this press is that, contrary to general practice, the cylinders back into the box rather than the rams, which are stationary, being secured to the resistance heads of the press. This construction is stressed as protecting the polished surfaces of the rams from the scoring action of small particles of scrap by keeping them removed as far from the box as possible. The cylinders in their travel are guided by heavy babbitt lined guides bearing on the polished strain rods of the press.

Assuming that the box is empty, and the door in the open position, the operation is as follows: Scrap is loaded into the box, after which the cover is slid quickly into place by means of the double-acting low-pressure cylinder, controlled by a small four-way cock. When the cover is in place, pressure is applied to the main baling ram, which is the main hydraulic cylinder shod with a steel face and over which the door slides, compressing the scrap to the far end of the box. The cylinder travels to a fixed stop, and after it has reached its limit, it is held in position by pressure being maintained on it, after which another three-way poppet operating valve is manipulated to introduce pressure to the secondary or smaller ram. This ram travels from an opening in the side of the box at one end, across the face of the main ram head, compressing the scrap still further into one corner of the box. As soon as the bale has reached its maximum compression, pressure is relieved from the hydraulic rams, after which the two plug cocks operating the low-pressure pullback cylinders are manipulated to pull the main pressure cylinders back out of the box, and at the same time remove the cover. The finished bale is then removed from the box and the process repeated.

Steel Scrap Baling Press Arranged for Mounting on the Floor or in a Shallow Pit. Both rams operate horizontally. The finished bale is 10 x 10 x 16 in. and weighs approximately 115 lb.

Refractories Prices Gain Advance

PITTSBURGH, Dec. 22.—Refractories prices still show a strongly upward tendency, due to the fact that manufacturers have profited substantially in matter of orders, by the improvement in consuming industries, notably the iron and steel industry, and so many have become so heavily committed that there is no longer the keen competition for business there has been during much of the time this year. There is not only that factor of strength, but the claim of manufacturers that prices throughout the year have been below costs. Even the recent advance of $3 per 1000 in silica brick, as noted in THE IRON AGE, Dec. 11, last, it is contended, did not bring prices to a profitable level. The latest advance puts that grade of brick $4 per 1000 higher in all producing districts. An advance of $3 per 1000 has been made in clay fire brick prices. There has been no change in magnesite or chrome brick. Prices are given on page 1707.

Noble Electric Steel Co. Leases Its Electric Iron Smelter

SAN FRANCISCO, Dec. 19.—The Noble Electric Steel Co., has leased its electric iron smelter at Heroult on Pit River, Cal., to M. A. Luce of Oakland, who has also taken a lease on the Shasta Iron Co. iron mines near the Noble plant. The smelter has lain idle for five or six years. Mr. Luce and his associates plan to conduct experiments with a view to resuming smelting iron directly from the ore by electricity. Fifteen men are employed now at Heroult.

Swaging Machine Adapted for Motor Drive

Following the trend toward motor drives, the new line of rotary swaging machines, placed on the market recently by the Standard Machinery Co., Auburn, R. I., has been designed with a one-piece cabinet base open at one end, so that a motor may be conveniently placed within it. This arrangement of the base, which may be noted from the accompanying illustration, permits also the use of belt drive from overhead.

The new line includes 13 sizes, which range in capacity up to 4 in., and replaces the line of machines formerly offered by the company. In principle the machine is the same as those of previous design and consists essentially of a spindle with a large slotted end, carrying dies backed up by hammers. As the spindle is rotated by the flywheel, the hammers come in contact with pairs of rollers which squeeze the dies together. This action of the dies takes place approximately 7000 times a minute in the smaller machines and causes the material being worked to gradually flow into the form provided by the dies.

Rotary Swaging Machine Base Open at One End to Permit Application of Individual Motor Drive

The rollers are spaced by a forged steel cage somewhat like a roller bearing cage and of an inclosed type. The rotation of the spindle causes this cage to creep, evenly distributing the wear of the rollers on the hardened ring with which the head is reinforced. This head ring, in common with other wearing parts of the machine, may be removed conveniently for regrinding or replacement. Thrust plates are provided to take end thrust of the roller cage front and rear. A third plate takes the spindle thrust and the die and hammer slot in the spindle is lined on three sides with hardened and ground plates. The dies are held in position by a fourth hardened and ground plate which is mounted in the door. The spindle, which is unusually large, is of forged steel accurately ground and runs in heavy bronze bearings. These bearings as well as all other friction members in the machine are lubricated by wick feed from central oil reservoirs.

The mounting of the door on two large taper pins is a feature stressed. The pins serve to locate accurately and lock the door in position and provide also automatic adjustment for wear. This type of locking device permits swinging of the door on either hinge and exposes the entire mechanism for die changes, cleaning and inspection of hammers, cage, rollers and other parts. Because of its rigidity the door is said also to provide means of attaching feeding-in fixtures to the front of the machine. The larger machines may be equipped with rack or hydraulic feeds to suit.

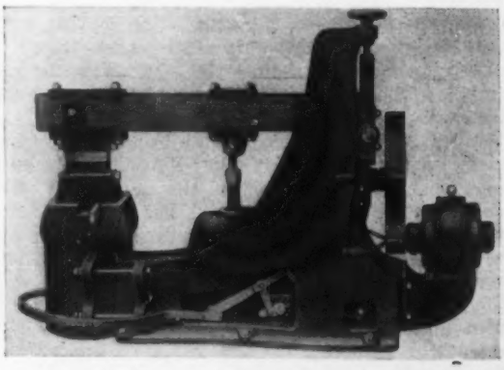
Air-Cushioned Helve Hammer

A helve hammer in which the hammer is cushioned by air instead of by rubber bumpers has been brought out by the Beaudry Co., Inc., Everett, Mass. The machine occupies less floor space than previously, and the advantage of being operated either by belt or by motor geared directly to the flywheel, without the use of intermediate clutches or belts, are points emphasized by the makers.

Delivery of the lightest tap or heaviest blow at full speed, a feature increasing production, is also stressed. The strength of the blow is regulated, as heretofore, by more or less pressure on the foot treadle. Variation in the pressure does not change the speed of the hammer, but simply the strength of the blow, and permits the operator to obtain light, quick blows. When at rest the hammer is at its top stroke, helve elevated and dies apart ready to receive the work. It gets into action instantly and at full speed, and time is not lost in striking several ineffectual blows while gradually getting up speed. The first blow of the machine is said to be as powerful as any succeeding blows, and one full positive blow can be struck the same as obtained under a drop hammer. After delivering the blow the hammer helve ascends to its previous position at the top of its stroke.

The machine is self-contained. It is made up of a semi-inclosed frame upon the rear of which there is an adjustable yoke supporting the helve at its pivoted end. Within the frame, cast in one piece, are two cylinders in one of which the air is compressed and in the other the air is distributed and employed for actuating the hammer. A rotary valve, operated by the treadle, is located between the two cylinders for regulating the amount of air and controlling the blow. The power plant is a separate assembly and may be removed conveniently from the machine.

The anvil is separate from the main frame casting also. The dies may be adjusted for different thicknesses of work by loosening four nuts on the pivot yoke and turning the handwheel on the top of the machine. The connecting rod of the helve is adjusted by means of a turnbuckle. These adjustments may be made by the operator without assistance, which is featured as an improvement over the usual manner of adjustment. The pivot of the helve consists of hardened steel centers, which are conveniently adjusted. This is said to eliminate side play of the dies, which always register with each other, making them particularly satisfactory for die work.



The Hammer Is Cushioned by Air Instead of by Rubber Bumpers. Light taps and heavy blows are delivered at full speed. When at rest the hammer is at its top stroke, helve elevated and dies apart

Four sizes of the machines, the rams of which range from 40 to 200 lb., are available. The average size of work ranges from 1¼ to 3¾, and the number of blows are from 300 to 230 per min. The floor space occupied by the smallest machine is 26 x 60 in., and by the largest, 36 x 75 in. The approximate weight ranges from 3200 to 9500 lb. United States patents have been applied for.

For Contents of This Issue See Orange Insert

Quotas of German Steel Syndicate

Official Figures Announced for Manufacturing Limits of the 31 Members—Conversion Factors for Finished Materials of Many Kinds

BERLIN, GERMANY, Dec. 2.—The agreement of the Raw Steel Syndicate is now published. It covers the production of raw steel by the Thomas, Bessemer, open-hearth, crucible, electric or any other process, so that even steel that might be manufactured by any newly invented process would be included. Out of a total output of 13,641,904 tons of raw steel, which forms the basis of quota distribution among the 31 members, the largest producers, Krupp, Phoenix and Thyssen, have a quota of 1,580,640 tons per year each. They are followed by Deutsch-Luxemburg with 1,006,640 tons, the Rheinische Stahlwerke with 940,800 tons, the Gutehoffnungshütte with 911,892 tons, the Klöckner Werke with 787,808 tons and the Eisen und Stahlwerk Hoesch with 746,916 tons.

Then there is a large gap and the next quotas, of more than 300,000 tons less, are those of the Ilseder Hütte with 470,928 tons and the Bochumer Verein with 470,000 tons. Above 300,000 tons are further only Linke-Hoffmann with 362,268 tons, Mannesmann with 337,980 tons, Oberschlesische Eisenindustrie with 324,324 tons and Maximilianshütte with 317,532 tons, while four members produce round about 200,000 tons, six about 100,000 tons and the rest less than 90,000 tons.

All these quotas are in raw steel. Other material produced is reckoned in raw steel units according to a fixed table, 1000 metric tons of blooms, for instance, are taken to require 1098.9 tons, billets 1129.94, and sheet bars 1142.86 metric tons of raw steel. Structural shapes, rails and track supplies, bar iron, wire, sheets, tubes, castings and forgings are recorded in the same manner.

The yearly quota of every member has been found by taking twelve times the production of any month during the period from January, 1922, to October, 1924. A few firms have addtiional quotas, up to 72,000 tons per year. The percentage of production is proportionately raised or reduced by the general meetings which take place every month. If for three months in succession an unlimited production is decided upon, the output of every firm during this time forms the basis of the quotas during the year following. The percentage of reduction in output during a certain month is, as far as possible, to be fixed four weeks beforehand, and the general meeting may decide that certain products are to be exempted.

A reduction in output decided upon applies to all members for any percentage fixed up to 25 per cent. If the output is limited by more than 25 per cent, and the production for own use of the company or the concern it belongs to has been restricted also, an amount equal to the same percentage of the "own use" is added to the quota of the respective company. Concern works are those in which the steel producer is interested to the extent of at least 50 per cent. The inclusion in the quota of the material produced for "own use" is a very important point in the new organization, as the former Steel Syndicate was broken up largely on account of the members making extensive use of the freedom they had in this respect.

Every member has to notify the syndicate by the tenth of each month of the production during the last month. If a member exceeds its quota within two months following, he has to pay a fine of 25 marks

Quotas in the German Steel Syndicate

(Weights in Raw Steel, in Metric Tons)

No.	Members	Quota	Additional Quota	Total
1	Bochumer Verein	470,000	.....	470,000
2	Deutsch-Luxemburg Bergwerks & Hütten..	1,006,640	.....	1,006,640
3	Geisenkirchener Bergwerks, A. G.	104,000	.....	104,000
4	Eisen & Stahlwerk Hoesch, A. G.	746,916	.....	746,916
5	Gutehoffnungshütte	911,892	.....	911,892
6	Klöckner-Werke, A. G.	787,808	.....	787,808
7	Friedrich Krupp, A. G.	1,580,640	.....	1,580,640
8	Phönix, A. G.	1,580,640	.....	1,580,640
9	Rheinische Stahlwerke..	940,800	.....	940,800
10	Thyssen-Gruppe	1,580,640	.....	1,580,640
11	Mannesmannröhren-Werke	337,980	.....	337,980
12	Eisenwerk Kraft	193,200	34,800	228,000
13	Gussstahlwerk Witten..	141,360	32,640	174,000
14	Menden und Schwerte, A. G.	67,200	.....	67,200
15	Westfalische Eisen- und Drahtwerke	64,104	6,696	70,800
16	Stahlwerke van der Zypen	221,916	.....	221,916
17	Rombacher Hüttenwerke	230,208	.....	230,208
18	Eisenhütte Holstein	60,720	.....	60,720
19	Henschel & Sohn, Abt. Heinrichshütte	207,912	.....	207,912
20	Rheinmetall (Rheinische Metallwaren & Maschinenfabrik)	82,212	.....	82,212
21	Ilseder Hütte, A. G.	470,928	72,000	542,928
22	Charlottenhütte, A. G..	100,260	.....	100,260
23	Geisweider Eisenwerk, A. G.	143,616	.....	143,616
24	Riemerhütte	67,140	18,860	86,000
25	Friedrichshütte Wehbach	74,907	5,093	80,000
26	Maximilianshütte Eisenwerks, A. G.	317,532	36,000	353,532
27	Linke-Hoffmann-Lauchhammer, A. G.	362,268	2,904	365,172
28	Eisenhüttenwerk Thale..	99,388	.....	99,388
29	Borsigwerk	98,160	.....	98,160
30	Oberschlesische Eisenindustrie, A. G.	324,324	.....	324,324
31	Oberschlesische Eisenbahnbedarfs, A. G. ..	57,600	.....	57,600
	Total	13,432,911	208,993	13,641,904

Table for the Conversion of Manufactured Goods into Raw Steel and Vice Versa

(In Metric Tons)

	Out of 1000 Tons of Raw Steel May Be Produced: (Weight of the Finished Article)	1000 Tons of the Finished Article Are Taken to Require, in Raw Steel:
Semi-finished material:		
Ingots	1,000	1,000.00
Blooms	910	1,098.90
Billets	885	1,129.94
Sheet bars	875	1,142.86
Rails and track supplies:		
Rails of 15 kilos per meter* and more	840	1,190.48
Iron sleepers of 15 kilos per meter* and more	835	1,197.60
Rails, below 15 kilos per meter..	830	1,204.82
Sleepers, below 15 kilos per meter	800	1,250.00
Guide rails	785	1,273.89
Fish plates	750	1,333.33
Tie plates	795	1,257.86
Shouldered tie plates for wooden sleepers	710	1,408.45
Shouldered tie plates for iron sleepers	600	1,666.67
Fish plates for grooved rails....	795	1,257.86
Structural shapes:		
Weight below 20 kilos per meter	805	1,242.24
Weight 20 to 100 kilos per meter†	865	1,156.07
Weight above 100 kilos per meter	795	1,257.86
Bar iron:		
Universal, flat, round, square, etc.	860	1,162.79
Rolled wire	870	1,149.42
Sheets, heavy, 5-mm. (No. 6½ gage) and above	760	1,315.79
Thin, below 5-mm.	700	1,428.57
Tubes, welded	800	1,250.00
Seamless	865	1,156.07
Castings and forgings:		
Railroad axles, raw forged	810	1,234.57
Railroad wheel stars	650	1,538.46
Railroad wheel disks	750	1,333.33
Railroad wheel tires	930	1,075.27
Steel castings	750	1,333.33
Forgings, raw	800	1,250.00
Steel cylinders, cast or forged...	800	1,250.00

*30 lb. per yd. †13½ to 67 lb. per ft.

for every ton he produced above his quota. Out of the fund so accumulated members which have not produced their full quota within two months following receive a compensation for the difference between their quota and their actual output, up to 25 marks per ton. The members are bound to allow a representative of the syndicate to inspect the books and to sell or lease their works only under the obligation that the buyer or lessee adheres to the Raw Steel Syndicate.

The term of the syndicate runs from Nov. 1, 1924, for five years, and every member may, after eleven months, give a month's notice of the termination of his membership. If notice has been given by a member the other members have to state whether they are still in favor of the agreement, or also wish to discontinue their membership. Should they declare in favor of the agreement, the syndicate is continued, and if no notice has been given after the first eleven months, the term of the syndicate automatically runs for the further four years.

If the production has been reduced by at least 40 per cent for three months in succession, a majority of the members may decide to dissolve the syndicate. If the raw steel output has been kept below 50 per cent for five successive months every member may withdraw after a month's notice. A weak spot in the organization is the absence of special syndicates for the various steel products. Their formation presents many difficulties, as the control of production by these organizations would deprive many manufacturers of the possibility to concentrate production on one article or another, in accordance with market requirements.

Fundamentalism in Ferrous Metallurgy—II*

Alloy and Stainless Steels—Direct Reduction of Ores—Plea for a National Research Institution

BY DR. B. D. SAKLATWALLA

IN connection with heat treatment may be mentioned another phenomenon which has received little study from the metallurgist and which is of paramount importance. This phenomenon is that of surface tension. It can readily be seen that, since the interaction of the microscopic, and probably also of the submicroscopic, grains of the steel on one another produces the desired engineering properties, surface tension is the determining factor in the attainment of these properties. It may appear at first sight an exaggeration to suggest that the force of surface tension is a more universally pervading and a more important force, from the engineering standpoint, than the force of gravity. However, very little deliberation will convince us that matter is inconceivable without being subjected to this force. In fact, all characteristic and fundamental properties of matter, manifested to us, are its surface-tension properties. We are not concerned with the intermolecular or interatomic properties, but are interested in the external energy manifestations of the molecules or particles forming the aggregate body.

Alloy Steel Metallurgy

The importance of fundamental deduction appears all the more potently in the study of alloy steels. It is being more and more conceded that the progress of our mechanistic civilization is closely linked with the advancement of alloy steel metallurgy. This recognition has stimulated the exploitation of alloys on a more or less purely experimental and empirical basis with disregard to fundamental study. We probably have adopted the tactics of the "pill-doctor," and if we persist in the purely experimental channel of making steels with different elements and different percentages of these elements with the variations of the other accompanying elements, and then trying them out, our task becomes not only endless but also thankless.

We have seen from the foregoing that the study of steel is more or less a study of the equilibrium conditions of its constituents, both in the liquid and the solid state. It stands to reason that the introduction of another metal, which chemically enters into these constituents, alters these conditions. For instance, in the liquid state the presence of another metal in solution in iron may change the viscosity, heat conductivity, capability of crystal growth, diffusion through the liquid or the solidified grain, facility or retardation to passage of non-metallics, which would all strongly influence the "pre-natal" qualities of the steel formed, as we have seen before. Also we can readily see that the surface energy qualities of the solidified grains will be altered, thus changing the conditions of heat-treatment and producing altered engineering properties in the finished material.

From the standpoint of equilibrium we can summarize the effect of alloys in general by recalling to our mind the iron-carbon equilibrium diagram. By the introduction of another alloying element we have disturbed the equilibrium conditions and as a result we have shifted in its entirety this diagram in the picture field in any possible direction. By the proper selection of the alloying element the direction of shifting can be destined. The transformations depicted by the diagram, therefore, take place at different temperatures or for the same temperature different thermal changes are presented. We can thus readily see the possibility of producing similar physical properties by the use of different elements and of the necessity of different heat treatments for different alloy steels. This naturally suggests to us the idea of some equivalence among alloying elements, not from the chemical equivalent standpoint but from the standpoint of equivalence in final engineering properties. A fundamental study of the effect of alloying elements will undoubtedly reveal the key to the secret of equivalence.

Stainless or Rustless Metallurgy

In very recent times another class of steel alloys has gained preeminence. These are the alloy steels, commonly known as of the "stainless" or "rustless" type. These steels contain amounts of alloying elements in very much larger percentages than is the case with the usual structural alloy steels. Our fundamental knowledge as to the effect of such percentages in resisting corrosion is even more limited than in the case of the structural steels. Empirism seems to have flourished more rampantly. This is perfectly understandable when we consider that our fundamental knowledge as to the cause of various forms of corrosion is, to say the least, extremely meager, and, therefore, progress temporarily must lie in the course of experimentation.

The principle which has stimulated experimentation in this field up to now seems to be that of equivalence. In the case of high chromium rustless steels, some of the chromium content has been successfully replaced by such elements as copper, nickel, silicon, etc. In such substitution there seems to be the additional advantage, for instance in the case of copper, of imparting to the steel acid-resisting properties, besides resistance to oxidation.

*From an address delivered at the December meeting of the American section of the Society of Chemical Industry, when the author received the Grasselli medal. The first half was published in THE IRON AGE Dec. 18 at page 1620.

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Reverting to our principle of equilibrium, undoubtedly the phenomena of non-corrosiveness can be deduced back to it after we have gained a little more insight into the mechanism of corrosion. Solubility or chemical activity is undoubtedly bound up with the free energy of matter and especially the surface energy. The size of grains is known in the case of aqueous solutions to alter the solubility. We may, therefore, find an explanation of the relation of non-corrosiveness of such steels to their structure and also of the effect of heat-treatment on non-corrosiveness.

The fundamentals of non-corrosive steels may lead us into equilibrium phenomena, not only of the micro constituents but into the ultra field. The atomic arrangement or introduction of the alloying atoms into the iron lattice may have the influence of changing the surface energy content and equilibrium conditions of the resulting physical grains. We may then consider non-corrosiveness as a function of what we may term "atomic architecture."

On account of the immense economic importance of the factor of corrosion in steel metallurgy, as so ably shown by Sir Robert Hadfield, it has stirred the metallurgist to develop processes whereby non-corrosive steels can be produced at such cost as to make their application possible for general purposes. This has been accomplished by obtaining the alloying element content directly from the raw ore into the finished steel. In this manner large percentages of the alloying metal can be introduced from a very cheap source. Besides the factor of cheapness, by such processes the alloying element is introduced in its nascent and pure state uniformly into the steel, avoiding all tendency to segregation.

Direct Reduction of Ores

In connection with the development of direct reduction of ores into steel, or in the manufacture of ferro-alloys for subsequent introduction into steel of such refractory metals as vanadium, chromium, tungsten, etc., the metallurgist has been obliged to study his problems of manufacture from a fundamental standpoint. The processes and apparatus of ordinary ferrous and non-ferrous metallurgy present limitations to the solution of the ferroalloy problems. The fundamentals of electric smelting, of regulation of electric current and temperature, had to be studied and high-temperature processes evolved, suitable for each reduction operation. There seems to be a lack of attempt in ordinary ferrous metallurgy to make the process adaptable to the product desired.

Undoubtedly ferrous products, such as pig iron and cast iron, are not just what they are desired to be, but more or less mere results of an economical and easily operated process. This has led to the condition that the art of ordinary steel-making has for its object the elimination of undesirable impurities, which have been only wilfully acquired in the blast furnace. This condition has led to efforts to smelt iron ore directly into refined steel, either by way of sponge-iron or otherwise. Such direct process portends not only to effect revolutionizing economies but also to produce ferrous metals of unexpected quality. The unknown factors of oxides, nitrides and the like, and their effects both direct and indirect on the other constituents of steel could thus be made controllable or entirely eliminated, and probably at such future time we will be in position to understand why the ultimate chemical analysis of the various elements in steel has failed to afford us a criterion of its quality. The veil of caprice and mysticism shrouding chemical analysis and structural qualities will be lifted to the joy of the construction engineer.

One feature in connection with what has been said in the foregoing deserves our closest and most thoughtful attention. We have realized the importance of fundamental research and establishment of fundamental data in connection with the metallurgy of as important a metal as steel. Naturally, the question arises how or where or by whom such data is to be obtained and assimilated. It is in the domain of pure science and neither the producer nor consumer of steels seems to be immediately concerned in the accomplishment of such research.

A National Research Institution

We can find the answer to this dilemma by looking around us a little bit. Institutions that can carry out such work have sprung up in the last few years in other countries and are amassing information of such nature. We have only to recall to our mind the National Physical Laboratory at Teddington in England. The Kaiser Wilhelm Eisen-Forschungs Institut and the Reichsanstalt and Materialpruefungsamt in Germany, the Swedish Institute for Steel Research under the able leadership of Dr. Benedicks, and the similar institution under Honda's guidance in Japan.

It appears from this that other civilized countries of the world have recognized this question to be of national importance and have established facilities and means for the progress of fundamental metallurgical work. In our own country we may turn to the unparalleled example of the Rockefeller Institute for Medicine and the furtherance of medical science by the fundamental and purely scientific work accomplished by that institution.

The peculiar conditions of the complex of our country make it desirable that an institution for metallurgical research should be established by an endowment along the lines of the Rockefeller Institute, to make it untrammeled from the instincts of commercialism or governmental politics, with the one object in view, namely: To further the progress of our civilization and to make us independent in exploitation of our natural resources and unhampered in our world commerce in times of peace or of war.

Plans of Dunbar Corporation

The Dunbar Corporation recently incorporated is the outgrowth of the purchase by the bondholders of the American Manganese Co., William P. Gest, Philadelphia, president; R. M. Marshall, Dunbar, Pa., vice-president and general manager; Edward S. Dunn, Philadelphia, treasurer; William E. Arnold, Philadelphia, secretray; Reginald Palmer, Uniontown, Pa., assistant treasurer.

It is the aim of this new organization to refinance and rehabilitate the Dunbar plant. The first effort will be to finance the necessary construction work to put the works in a competitive position with other blast furnace companies.

The plant comprises two 250-ton blast furnaces, 110 Semet-Solvay by-product ovens, 1000 acres of developed coal land, unlimited sand rock quarries and a sand mill with a capacity of 400 tons a day. In addition, the company owns all the stock of the New Haven & Dunbar Railroad Co. with a trackage of 12 miles, the Dunbar Electric Co. with over 500 subscribers, the Dunbar Water Co. with two dams of 4,000,000 gallons capacity and 2½ miles of 14 in. water line. The company owns 3500 acres of timber land and extensive bluestone ledges, both of which are in the process of being developed.

Republic Iron & Steel Co. Awards Contract to Koppers Co.

The Republic Iron & Steel Co., which as announced in THE IRON AGE, Dec. 18, will build a by-product coke plant at Birmingham, Ala., has placed the contract with the Koppers Co., Pittsburgh. The plant will consist of 57 ovens, of the Koppers-Becker type, with an annual coal carbonizing capacity of 300,000 tons, from which is estimated there would be a yield of 450,000 tons of coke. This production will just about meet the annual requirements of the company's three blast furnaces in the Birmingham district. It is expected the plant will be completed late in 1925.

CENTRIFUGAL CAST PIPE

New Process for Iron to Eliminate Chilling and Annealing—Mercury Vapor in Hollow Sleeve Mold

A new process for making cast iron pipe centrifugally has been developed by some New York engineers and interesting claims as to its success are now made public, as well as some of the details. It is known as the Henry-Weitling-Peake process. Researches and experiments connected with the development of this process have extended over the last four years and casting machines are reported as having been satisfactorily operated at the Newark plant of the Flockhart Foundry Co., and at the plant of the Union Mfg. Co., New Britain, Conn. Some of the details of the process and of the claims made for it are now released for publication by W. W. Weitling, vice-president American Hardware Rubber Co., 11 Mercer Street, New York, and co-trustee with the Chemical National Bank of New York of the various patents and patent applications.

The new method claims to have solved the problem of providing a satisfactory process for making cast iron pipe in a rotating permanent metal mold, and yet one producing directly a soft gray iron casting. It thus aims to eliminate the necessity for the annealing or heat-treatment of the casting after it leaves the mold.

A simple machine is employed. The entire molten metal charge is poured into the mold at any point. The mold is not only permanently mounted in the machine, but is itself a permanent mold.

The bell core, also, is permanent, being formed of solid pieces of gas carbon. This material was first tried as a lining for the mold itself. The use of carbonaceous material in a rotary mold, on a core for such a mold, or otherwise in rotary casting, is discussed in United States patent to Henry, No. 1,501,338.

Mercury Vapor a Feature

The actual present practice of the new process involves the employment of liquid mercury and mercury vapor. The vapor is admitted to and withdrawn from an annular chamber in a double-walled rotatory structure (the inner wall constituting the mold), by way of a single combined inlet and outlet. The vapor is in a closed system including the annular chambers. The pressure of the vapor in each machine is modified by different amounts at different times during each casting operation in each machine. High-pressure, that is, high-temperature, vapor, needed to be drawn at a particular moment from one machine is passed on to another machine needing at that same moment to have its vapor-blanket increased in pressure and temperature.

For a battery of three to five machines, about 100 lb. of mercury, costing 80c. per lb., is needed. This mercury is a permanent installation on the basis that none of it should be lost. It is simply first vaporized, then condensed, then vaporized, etc., in different parts of the closed system.

These things are accomplished automatically by Sarco regulators. In each machine the metal mold is brought to a temperature of approximately 900 deg. Fahr. just before the molten charge is admitted. As the mold approaches thermal equilibrium with the molten metal, the superheated vapor is passed on for use elsewhere in the system, as noted. The pressure of the vapor is so relieved that the molten metal gradually sets sufficiently to permit the extraction of the casting from the machine.

When the casting has reached the state of rigidity last indicated, the pressure of the mold's vapor-blanket and consequently the temperature of the mold are supervised so that the casting may not further cool during the short time required to slide it out of the machine, to the point where pro-eutectoid cementite commences to form. Thus the pipe casting is abstracted, under the process, before its contact with the mold can result in chilling any part of the casting through the propagation of combined carbon. As soon as a machine is freed of a casting, the vapor-blanket of its mold is once more subjected to pressure modification and is gradually brought to the correct temperature for receiving another charge of molten metal.

Source of Heat for Mercury

The principal source of heat supply to the walls of the mold is the molten metal which is being formed into the casting and practically all of the heat for maintaining a supply of mercury in the vapor form is furnished by the casting machines themselves. An external source of heat supply as well as heat rejection is desirable; but only a small one, it is said, is required and to act as a heat balancer.

MORE JAPANESE TRADE EXPECTED

Improved Conditions Next Year May Help Buying—Large Pipe Order from Japan

NEW YORK, Dec. 22.—With the exception of a few inquiries from municipal and semi-official sources, Japanese trade is quiet as the year draws to a close. A slight improvement in Chinese business is reported and this has been accompanied by a revival of interest among Chinese merchants in purchases of second-hand material and wire shorts. While there has been more inquiry lately from Chinese markets, little business has developed thus far. This recovery in Chinese prosperity is expected to exercise a beneficent effect on Japanese exports, which suffered considerable curtailment as a result of the recent political disturbance in China. In addition to this assistance to a revival of prosperous conditions in Japanese business, it is expected that the Japanese Government will release sufficient specie early in January to help advance the yen in foreign exchange and a further upward movement of the yen may be induced by the export, particularly to the United States, of Japanese raw silk. As a result, exporters to the Far East look for at least a slight improvement in Japanese and Chinese business in the new year.

Among recent inquiries from Japan was that of the Imperial Government Railways, which closed Dec. 18, on 1,200,000 ft. of gas pipe. The Nagoya Electric Railway is receiving bids on 3000 pairs of splice bars and the Keijo Electric Railway is in the market for 2 miles of 82-lb. high T rails and one-half mile of 117-lb. guard rails and accessories, as well as switch material for 60-lb. and 117-lb. sections. Bids are acceptable c.i.f. Kobe or Chemulto, Chosen. The Toho Gas Co., recently in the market for 300,000 ft. of gas pipe, placed its order with Takata & Co., New York. Tokio municipality has awarded 1100 tons of steel piling to Mitsui & Co., for Lackawanna piling.

Buying of light gage black sheets showed a slight improvement in the past week, but purchases were confined to small lots. American mills are quoting from $96 to $98 per ton, c.i.f. Japan, with occasional reports of business going at as low as $93 per ton, c.i.f. Japan. British makers are reported to have dropped to $82.50 per ton, c.i.f. Japan on light gage black sheets, but British mill quotations are generally higher. But little activity in either sheets or tin plate is expected for some time unless the investigation now being made by the Japanese Government into the advisability of revising the general tariff, which goes into effect on sheets and tin plate March 10, results in action to reduce the duty on these products.

The annual inquiry of the Chilean State Railways is expected to appear before long. This call for bids generally specifies upward of 10,000 tons of rails. The purchase in 1924 was close to 14,000 tons, of which more than 50 per cent went to Continental mills at a price close to $30, c.i.f. Chilean port, compared with the American mill price of about $39, c.i.f., which took a part of the total tonnage. Tests have been carried out by the Chilean State Railways on the comparative qualities of American and Continental rails.

For Contents of This Issue See Orange Insert

Storing Coal in Hollow-Tile Silo

Handling Equipment with Self-Weighing and Recording Features—Live and Reserve Storage in One Unit

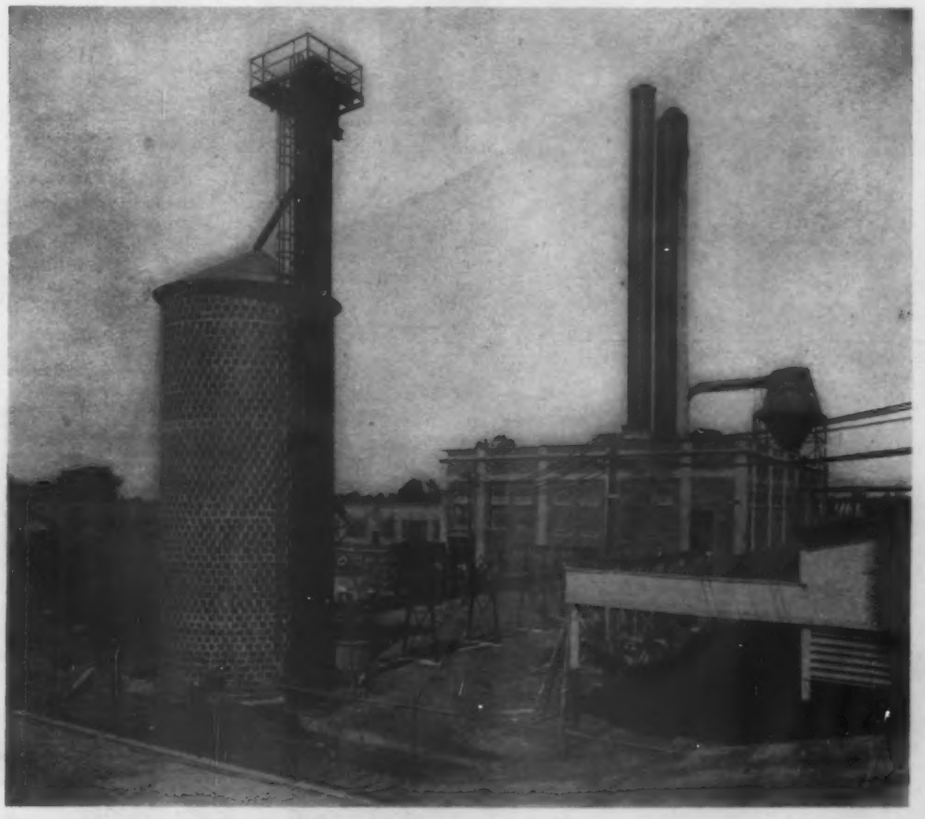
RECOGNIZING the desirability of locating a mill near the source of raw materials, the Fisher body Corporation's Memphis plant is equipped to produce wood parts for automobile bodies, which parts can be shipped to assembling plants, thereby showing material freight savings. Extensive additions have been made to the boiler house which, it is said, provides in Memphis one of the best laid-out and equipped plants of the kind in the country.

In the boiler house are two 720-hp. Heine boilers for burning shavings and other waste products from the woodworking machines, or for burning coal on underfeed stokers, in addition to four 300-hp. Wickes vertical tube boilers originally installed. The interior view of the boiler house shows how the shavings are passed from overhead bins by means of screw feeders to down spouts delivering direct into the furnaces.

In providing for the economical unloading, storing and delivering of coal to the stokers the company was confronted with an unusual problem because of the fact that the initial unit of the boiler house is located about 175 ft. from the railroad siding, so as to provide for future expansion toward the siding. Working with the Stearns Conveyor Co., Cleveland, equipment was designed which met this problem.

The coal handling plant, as now installed at Memphis, unloads, crushes and elevates coal at a rate of 30 tons per hour, placing it in storage bins having a capacity of 375 tons. To provide further additional storage capacity at small expense, if later needed, it will be necessary only to build a second bin identical with the first. This would be placed on the opposite side of the elevator, and fitted with a spout from the head of the present elevator.

Beneath the tracks on the siding a track hopper has been installed, with track girders of sufficient weight to carry a 60-ton locomotive. Run of mine coal can be delivered to this hopper, either by dumping any type of self-unloading car, or shoveling over the side of an ordinary gondola. To the bottom of the hopper was attached a reciprocating feeder, which feeds the coal evenly to a heavy double roll crusher. All lumps are here crushed to 1¼ in. and finer, so that the coal can be used in the stokers. From the crusher the coal is passed into the boot of a 14-in. bucket elevator, which discharges into the storage bin.



Silo Is 175 Ft. from Boiler House, which Is to Grow Toward It. Coal from railroad cars, dropped into hopper, is hoisted by elevator to top of silo and falls into a conical bin of 75 tons capacity. Overflow from this bin falls into the lower part of silo and forms reserve storage (300 tons capacity), whence it may be hoisted to the "live" bin at will. The motor-operated larry car feeds the boilers

Because of the small space it occupies the storage bin constitutes one of the important features of the installation. With but a space of 21 ft. required, it provides a capacity of 375 tons of coal, or approximately ten cars. The bin is built of glazed, hollow tile, reinforced with steel hoops. A steel cone is suspended about 5 ft. below the eaves, which has a capacity of about 75 tons, or two cars of coal. A spout at the bottom of this cone discharges directly into a weigh larry car.

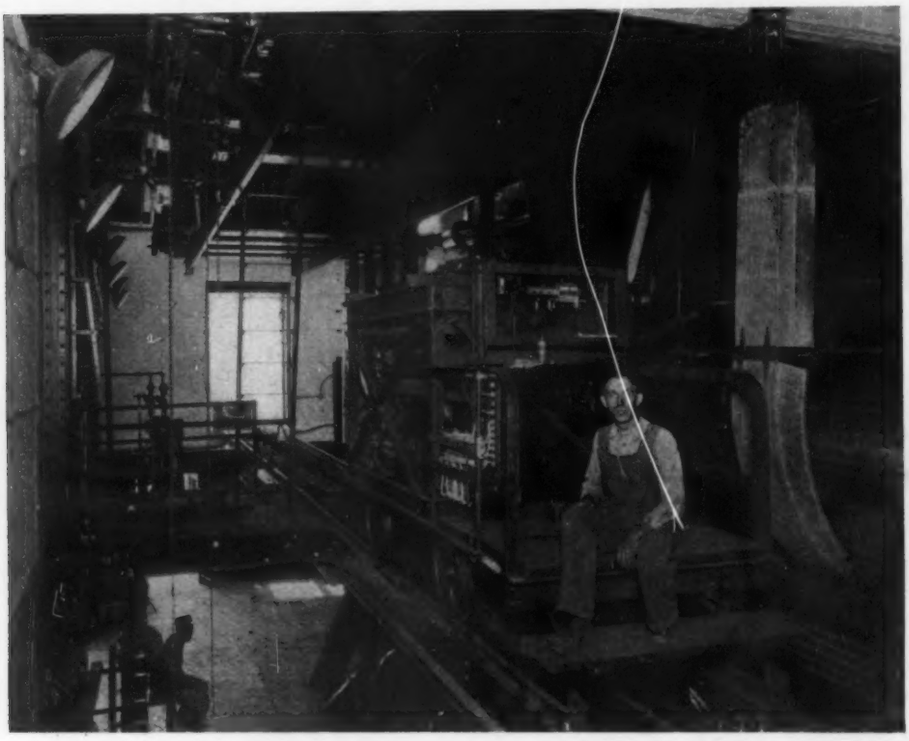
Openings are provided around the top of the cone so that as soon as it is filled to capacity the coal will automatically overflow into the lower or reserve storage compartment. The coal can then easily be reclaimed through a chute in the bottom of the bin, into an elevator boot. The elevator then carries it to the upper or live storage compartment. In other words, there is a live storage of two cars of coal which can

be spouted directly to the weigh larry, and the remaining eight cars are at hand ready to be converted into live storage simply by starting the elevator and opening the gate on a reclaiming spout.

Experience indicates, it is said, that this method of storing coal, where surrounding conditions will permit its use, provides the most storage per dollar of any method yet devised.

By means of a traveling weigh larry the coal is carried from the storage bin and discharged directly into stoker hoppers. The larry track is carried on a trestle, and a motor-propelled car type larry is used. The scale is equipped with a card-punching device, giving the weight of each load. So dependable is this device that it is not even necessary for the operator to read, as the card-punching device prevents error in recording weights.

This installation not only has accomplished the desired ends at this plant, from the standpoints of layout and efficiency, but it has eliminated danger of fire through spontaneous combustion—a common and real danger in older types of open storage piles and bins. The tile silo, distinctly a Stearns product, is practically airtight and there are no dead pockets of coal in which heat may be established.



These Boilers Use Either Coal or Shavings. Coal comes in on the larry car and is dropped into stoker hoppers. Shavings are passed from overhead bins by means of screw feeders to downspouts, such as that shown at right, and thus into the furnaces

Steel Jobbers at Detroit in 1925

It has just been decided to hold the 1925 convention of the American Iron, Steel and Heavy Hardware Association at the Book-Cadillac Hotel, Detroit, on May 19, 20 and 21. The business program will be limited to morning sessions and the membership is promised that these will start and end on time. C. R. Williams, Williams Hardware Co., Minneapolis, is president of the association; G. M. Congdon, Congdon & Carpenter, Providence, R. I., chairman of the board, and A. H. Chamberlin, secretary-treasurer.

Total exports of the United States for the first 11 months of 1924 aggregated $4,145,726,294, according to figures of the Department of Commerce. This is an increase of $404,898,733 over the $3,740,827,561 for the first 11 months of last year, and is almost equivalent to the $4,167,493,080 representing the entire outgoing movement for 1923. Exports exceeded imports by $869,053,327, or almost four times as much as in 1923.

Automobile Production Falls Off

November output of automobiles is given by the Department of Commerce at 195,279 passenger cars and 26,848 trucks, a total of 222,127 vehicles. This is the smallest total since September, 1922, when the aggregate was 207,208 vehicles. It compares with October figures (revised) of 257,915 passenger cars and 31,455 trucks, or 289,370 altogether, and with November, 1923, at 284,939 passenger cars and 28,085 trucks, or an aggregate of 313,024.

For the 11 months of the year the production has reached 3,009,099 passenger cars and 333,601 trucks, or a total of 3,342,700 vehicles. This is about 9 per cent below last year's total for 11 months, which was 3,361,744 passenger cars and 348,672 trucks. With the exception of last year the production in 11 months this year has been greater than in any previous entire year.

Increase in Employment Since July

Of ten industries which had reported the heaviest reductions in force during the gradual slump from April, 1923, to July, 1924, seven appear in the list of the ten reporting the heaviest gains from July to October, according to figures of the National Industrial Conference Board. Iron and steel reports 23 per cent increase against a previous loss of 31.8 per cent; rubber reports 44.5 per cent increase against 36.9 per cent previous loss; wool reports 12 per cent increase against 24.5 per cent loss; agricultural implements, 9.4 per cent increase against 30.4 per cent loss; paper and pulp, 5.8 per cent increase against 20 per cent loss; furniture, 4.4 per cent increase against 21.2 per cent loss; automobiles, 3.9 per cent increase against 39 per cent loss. Foundry and machine shop products show a decrease of 9.5 per cent.

It is evident that the loss in most cases has not been wholly made up, although the increasing trend is gathering speed. October figures for 23 industries show an increase of 7.2 per cent over July, the October gain being greater than that in August and September combined.

Shipments of pig iron from Middlesbrough, England, in November were 34,970 gross tons, of which 18,532 tons went coastwise and 16,438 tons export.

For Contents of This Issue See Orange Insert

PLANER WITH NEW FEATURES

Cross Rail Carries Own Motor for Rapid Traverse of Rail and Heads—Control Centralized

Arrangement of the cross rail as a self-contained unit, carrying the mechanism for power rapid traverse of the heads vertically and horizontally, as well as elevating or lowering the cross rail, is an outstanding feature of a new planer recently brought out by the Liberty Machine Tool Co., Hamilton, Ohio.

The unclamping, elevating, lowering and reclamping of the rail, as well as the power rapid traversing of heads vertically and horizontally is accomplished by means of the lever shown at *A* in the accompanying illustration. Actuating these movements with one lever is stressed as eliminating the possibility of two movements at one time, providing "fool-proof" control of the rail.

The feed of the two heads vertically and horizontally is controlled by means of the levers *B* and *C*, and the dial indicator *E* shows the amount of feed obtained by turning handwheel *D*. The motor for power rapid traversing and elevating the rail is of 1½ hp. and is built-in on the back of the rail. It receives its current, either alternating or direct, from protected trolleys located on the side of the housing, or if necessary the motor may be connected with a light socket. Both heads are moved on a single stationary screw, the screw being in tension at all times and the nuts being revolved around it.

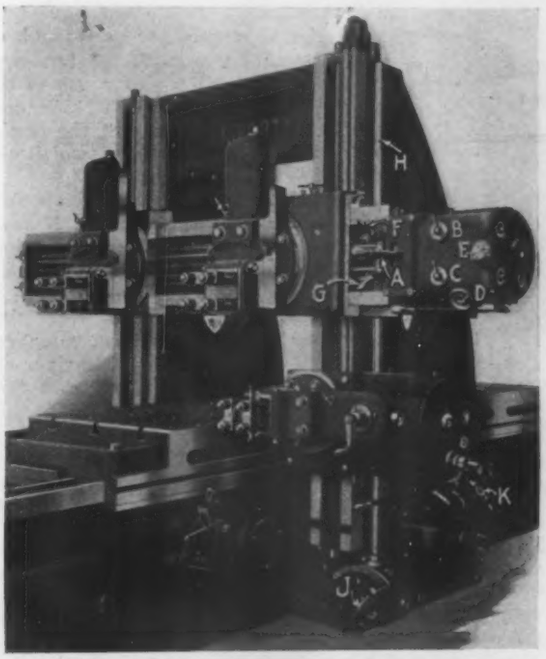
The horizontal feed of the left-hand head is engaged or disengaged by means of lever *F* which also engages and disengages the vertical feed of the left-hand tool slide. This arrangement is emphasized as eliminating the necessity for going to the opposite side of the machine to make this adjustment. The lever *G* controls the right-hand head in a similar manner. The mechanism for clamping the rail to the housing is controlled by lever *A*, these clamps being located and operated on the inside of the housing.

Vertical movement of the tool slide is accomplished by means of a nut revolving around a screw in tension. The screws for elevating the cross rail serve a double purpose. They elevate and lower the rail, and being stationary and in tension, they are employed for feeding and for power rapid traversing the side head, this arrangement being emphasized as eliminating two screws for operating a four-head planer. The vertical shaft shown at *H* is employed only in transmitting power from the gear box to the feed mechanism for both rail heads and side head. The gears are arranged so that by moving the lever shown at *I* into one of two different positions, the feed takes place either at the end or just before entering the cut.

The gearing and mechanism for controlling the feed and power rapid traverse, on the end of the cross rail and side heads, and also the feed reversing mechanism at the bottom of the housing, run in oil. Sight-feed oilers are provided for indicating the oil level in the various casings.

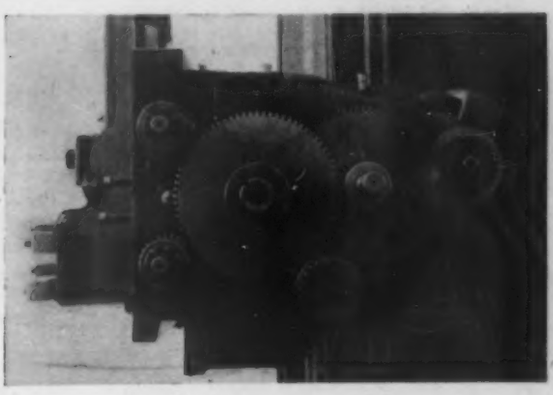
Among the general features may be mentioned the housings which are wide and extend to the floor as shown. They are attached to the bed by means of bolts in reamed holes and heavy dowel pins, which is intended to prevent movement. The bed is of double-wall type, ribbed lengthwise and crosswise and closed at the top. It is of double length so that the table does not overhang at the ends. Forced-feed lubrication to the Vees is provided from oil reservoirs between the double walls of the bed. Wick inserts extend the full length of the bed. Bearings for the shafts are of bronze, and the oil in the bearing is under pressure at all times. Oil entering the bearings is first filtered in the bed and in addition, passes through felt wicks. A two-way pump is located near the operator and in the piping near the pump is a window which indicates whether or not the oil is flowing properly. A cabinet for tools and clamps is built in the bed as shown.

The gear box containing the drive is cast in the bed, with no parts extending below the floor. The gears are of steel, heat treated, and run in oil. The first pair is of herringbone type, driving to double intermediate gears, carrying between them the bull gear pinion. A balanced drive is claimed, eliminating friction or side thrust. The rack is of 0.50 per cent carbon steel and is cut from a solid forging.



The Cross Rail Is a Self-Contained Unit Carrying the Mechanism for Power Rapid Traverse of the Heads as Well as Elevating or Lowering the Cross Rail. It will be noted that no mechanism appears on top of the machine, with the exception of the sheaves for carrying the counterweights for the side head

Arrangement of the End of the Cross Rail May Be Noted from Views Above and Below. The motor, which is of 1½ hp., is built in on the back of the rail, as shown

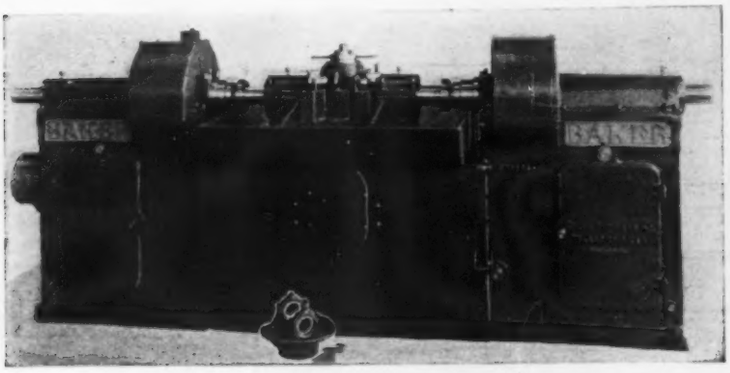


The table is of box type or double deck construction. Wide openings are cored through at the bottom of the Tee slots which are intended to permit chips to drop to the lower table deck. A steel gib the full length of the table is intended to eliminate lifting of the table under heavy cuts. An improved automatic shifter is a new feature. It will be noted that no mechanism appears on top of the planer, excepting the sheave wheels for the counterweights for the side heads. The counterweights are inside of the housings.

Two-Way Automatic Horizontal Boring and Drilling Machine Adapted to Variety of Work

Baker Brothers, Inc., Toledo, Ohio, has placed on the market a two-way automatic horizontal cam-feed boring and drilling machine, which, although of production type, is flexible as to alterations for a wide variety of work. Two types are available, No. 3 and No. 3M, which are adapted to single spindle and multiple spindle, opposed operations, respectively.

The center section of the machine is made special to suit the requirements of the particular work to be machined, the cams being special also. A tapping lead may be provided as in the case of the machine illustrated, which is adapted to rough and finish boring and tapping the differential carrier shown at the base. The piece shown is of malleable iron and the operations are rough bore, finish bore and tap the cross bores. A combination bar carries the rough and finishing cutter and collapsing tap. The feed, which is actuated by cam as previously noted, is changed between roughing, finishing and tapping cuts. The feed for the rougher is 0.032 in. per revolution, for the finisher 0.048 and a positive lead to the tap. Rapid automatic advance and withdrawal of the spindles to and from the work is provided. The machine stops automatically at the end of the cycle, and is again started by a conveniently located push button. The rapid advance and withdrawal of the spindles, and the ability to change the rate of feed for different operations and also to face to an exact depth are emphasized as prominent advantages of the cam feed arrangement.



New Horizontal Cam-Feed Boring and Drilling Machine Arranged for Rough and Finish Boring and Tapping the Piece Shown at the Base. The center section of the machine is made special to suit the class of work to be done

Both spindles are mounted on adjustable bronze bushings at each end, the bushings being of ample size to maintain closely accurate alinement of the spindle and to eliminate chatter. The spindles are arranged with a No. 4 taper and special driving slot. The feed cams are flat and of simple design and may be changed conveniently. Two doors provided at the front of the machine make the cams and feed changes easily accessible for changes. Speed gears to meet the requirements of the work are furnished, and may be changed at any time.

Either belt or motor drive may be provided, the latter, using a 5-hp., 750-r.p.m. motor, being recommended for the No. 3 machine. The motor is coupled direct to the main drive shaft, a solenoid brake, which is regular equipment, is applied to the armature shaft for stopping the spindle immediately when the cycle of operation is completed. Pump, tank and fittings, with table arranged with ample lubricant pockets, are furnished as extra for work requiring a cutting lubricant.

The No. 3M machine for multiple operations is slightly different in head design, and varies with the number of spindles and center distance required. In this machine the entire head carrying the spindles slides on scraped ways.

Canadian Iron and Steel Production Small

November output of pig iron in Canada is reported by the Dominion Bureau of Statistics at 22,994 gross tons, of which 20,720 tons was produced for sale. This compares with 28,626 tons in October and represents one of the smallest monthly production figures in years. For 11 months the total has been 570,480 tons, of which 226,213 tons was for sale and 344,267 tons for use of the makers. Only three of the 20 Canadian blast furnaces were active at the beginning of the month and only two at the end of the month.

Ferroalloys produced in electric furnaces amounted to 1373 tons in November, compared with 1350 tons in October. The total for 11 months was 24,781 tons, or an average of 2253 tons.

Steel ingots produced in November aggregated 22,047 gross tons, compared with 19,061 tons in October. Basic open-hearth ingots accounted for 20,510 tons of this total. The aggregate for 11 months was 599,591 tons. Steel castings made during the month amounted to 697 tons, of which 310 tons was open-hearth basic, 72 tons Bessemer and 315 tons electric furnace steel. These figures compare with 935 tons produced in October, of which 462 tons came from open-hearth basic furnaces, 69 tons from Bessemer converters and 404 tons from electric furnaces. The aggregate steel production in the month was 22,744 tons, compared with 19,996 tons in October. The average month of 1923 provided about 73,700 tons of steel ingots and castings.

Commercial Steel Castings in November

Bookings of commercial steel castings during November are reported by the Department of Commerce at 74,220 net tons, or 73.7 per cent of capacity, this being the highest figure, with the exception of last March, in considerably more than a year. The total may be compared with 66,697 tons in October and with 42,008 tons in November, 1923. The current figure includes 41,343 tons of railroad specialties, or 105.7 per cent of capacity, and 32,877 tons of miscellaneous castings, or 53.4 per cent of capacity. The railroad specialties are the highest in many months, with the sole exception of March, but the miscellaneous castings are at only about an average rate, as evidenced by the 10 preceding months of this year.

The General Petroleum Corporation will begin distribution of its products in San Francisco and Oakland about March 1, 1925. Sites have been purchased at the Parr terminal in Oakland and on Islais Creek in San Francisco for the building of distributing plants to serve the Bay Region and northern California. Construction has been started. When completed, the plants will include 200,000 bbl. of steel storage, together with warehouses, garages, shops and complete equipment for distribution by tank-truck, tank-car and barge. The cost of plants and equipment will exceed $1,000,000.

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Tile silo gives most coal storage per dollar of cost. Spontaneous combustion risk eliminated.—Page 1675.

Over four billion dollars worth of exports from United States during first 11 months. 10 per cent above same period of 1923.—Page 1675.

In expectation of heavy building program in 1925, Austin Co. will double steel fabricating capacity at Euclid.—Page 1666.

Connellsville coke may cost the buyer 50 per cent more in next quarter than in past six months.—Page 1682.

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Automotive output smallest since September, 1922. November production 222,127 vehicles.—Page 1676.

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Progress of civilization is closely linked with advancement of alloy steel metallurgy.—Page 1672.

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Hourly wage rate of union labor reaches highest point in 1924.—Page 1668.

With fewer workers, United Alloy Steel Corporation increases output and lowers production costs. Improved equipment responsible.—Page 1663.

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WORKERS SURPRISED

Men in Coke Region Did Not Expect Advance in Wages—Effects Elsewhere

UNIONTOWN, PA., Dec. 22.—Action of independent coal and coke operators in the Connellsville region in announcing a new wage scale—in many plants effective Dec. 16 and in others Jan. 1—came as a complete surprise to workers in the region. The new scale is virtually the same as that paid in the union fields and is almost identical with that paid by the H. C. Frick Coke Co. and established in August, 1922. The scale is the highest ever paid in the Connellsville region. The new scale is effective or will be effective at practically every plant in the Connellsville coke region by Jan. 1.

What the effect of the new scale will be on the first quarter business next year is problematical. The district had just started to hit its stride, with independent interests able barely to do business at a profit under the old scale. Observers are watching with a great deal of interest the turn of the market for the first and second quarters—and there is more or less anxiety in the watching. It is believed, however, that the general industrial situation will be such that there will be no suspension of activities because of the new scale.

Effect on other regions is also being watched. Announcement of the new wage scale caused a sensation in the West Virginia fields, and especially in northern West Virginia, where practically half the tonnage during the past few months has been produced by non-union labor. Other fields in Pennsylvania probably will be seriously affected.

Announcement also was made this week of the putting in operation of approximately 1600 additional ovens by the H. C. Frick Coke Co., and addition of some 3500 ovens at Frick plants since the election. Frick company operations are now around 65 per cent. W. J. Rainey, Inc., blew in 881 ovens this week. The Washington Coal & Coke Co. has some 300 ovens out of 800 available ovens in operation.

The Measuring and Grading of Supervisory Personnel to Be Discussed

An address on "Measuring and Grading the Supervisory Forces" will be given by W. D. Stearns, works department, Westinghouse Electric & Mfg. Co., East Pittsburgh, at the first session of the annual convention of the American Management Association, to be held at the Hotel Astor, New York, Jan. 28 to 30. Mr. Stearns' address will be followed by group meetings on the topic.

"What Can Business Learn from Modern Army Organization" is the title of a paper by Col. R. I. Rees, assistant vice-president, American Telephone & Telegraph Co., and Col. E. Z. Steever, personnel director, General Electric Co., to be delivered the same day. A. B. Gilson, manager, Westinghouse Technical Night Schools, will speak on "Public Schools and Apprentice Training," at the evening session. Other addresses the first day will be on the following subjects: Applying incentives to mutual benefit associations; what should be run in employee magazines; health supervision manuals; and vocational training.

An address on limitations in the use of psychological tests, to be given Jan. 29, will be followed by group meetings on the subject. "Placing and Introducing Employees" by Earl B. Morgan, manager, employment and service, Curtis Publishing Co., is on the program, and also an address by John Mills, personnel director, engineering department, Western Electric Co., on the subject of "Selecting and Placing the College Graduate in Business."

Group meetings will follow a paper on employee lunch rooms and also on a paper on essential personnel records. The group meetings, it should be said, include the four groups each, the office, factory, retail organizations and the field sales force. "Class Room Training of Employees," an address by G. B. Thomas, educational director, engineering department, will also be followed by group discussion.

A. J. Beatty, educational director, American Rolling Mill Co., will present a paper on "Education of Employees in Economics," at morning session, Jan. 30. Other subjects to be discussed at this session include the technique of job analysis and payroll administration.

New List Prices and Discounts on Turnbuckles

Manufacturers of turnbuckles have announced new list prices and discounts effective Dec. 15 and like the bolt and nut makers, are allowing freight to destinations east of the Mississippi and north of the Ohio River. It is explained in connection with the change that turnbuckles have been selling at prices equivalent to those ruling before the war and that the new list represents an effort to insure a reasonable return on increased manufacturing costs. At the same time, the list is so arranged that two discounts can be applied against it instead of the multiple system of discounts formerly employed. On a majority of the sizes, it is said, the advance in price is small, owing to the freight allowance given. On some of the larger sizes the advance is considerable, but the tonnage in those sizes is very small compared with sales of standard sizes. The new list is as follows:

Size of Screw	Price Each	Size of Screw	Price Each
⅜-in.	$0.38	1⅝-in.	$3.25
½-in.	.45	1¾-in.	4.00
⅝-in.	.50	1⅞-in.	5.00
¾-in.	.60	2-in.	6.25
⅞-in.	.75	2¼-in.	9.25
1-in.	.90	2½-in.	13.00
1⅛-in.	1.10	2¾-in.	14.50
1¼-in.	1.40	2¾-in.	16.00
1⅜-in.	1.70	2⅞-in.	17.50
1½-in.	2.10	3-in.	19.00
	2.50		

The discount on buckles with stubs is 50 per cent off list, and on buckles without stubs, 70 per cent off. In addition there is a further allowance of 5 per cent granted to buyers at the end of each quarter on any size where specifications have amounted to 500 or more pieces. Thus the discounts for such customers will be 50 and 5 off on buckles with stubs and 70 and 5 off for buckles without stubs.

The list prices published above apply only on turnbuckles with the standard opening of 5½ in. between heads. For a 9-in. opening 50 per cent is added to the list, for a 12-in. opening 75 per cent is added, for a 15-in. opening 100 per cent, for an 18-in. opening 150 per cent, and for a 24-in. opening 250 per cent.

On shipments of less than 1000 lb. the list and discounts are f.o.b. mill, but on shipments of 1000 lb. and over freight is allowed in the following territory:

All cities on or east of the Mississippi River to Cairo, Ill., and as far north as a line drawn from Milwaukee, Wis., to Dubuque, Iowa. All cities on or north of the Ohio River to Ironton, Ohio. All cities on or north of the main line of the Norfolk & Western Railway from Ironton, Ohio, to Norfolk, Va. The upper peninsula of Michigan is excepted from the above territory. On Pacific, Atlantic and Gulf Coast shipments by water prices are f.a.s. Atlantic ports of New York, Philadelphia or Baltimore. During the season of Lake navigation, freight to Duluth, St. Paul and Minneapolis is allowed. On shipments beyond the zone, freight is allowed to the natural gateway where shipments cross the zone line.

More Models and Patterns Made

Models and patterns were produced in 1923 by 697 establishments to the amount of $30,164,709, or almost double the $15,742,112 from 656 establishments in 1921. The number of wage earners increased from 3936 to 5813 and their wages from $6,026,634 to $9,765,810. The horsepower used amounted to 12,170 in 1923.

Bituminous coal produced in November is reported by the Geological Survey at 40,734,000 tons, the smallest figure for November, with two exceptions, since 1914. Anthracite coal in November totaled 6,776,000 tons, the smallest figure for November in more than 10 years.

ESTABLISHED 1855

THE IRON AGE

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Available Connellsville Coke

USING the Connellsville coke region as a convenience may not be as easy as has been lightly assumed. Last summer some operators in the region were anxious to sell coke at $3 a ton, and on the surface it looked as if there was a great deal more where that came from. The very sudden wage advance of last week directs attention to the fact that labor is an item in coke production. It looks as if Connellsville coke would cost the buyer nearly 50 per cent more in the next three months than in the past six months, yet it appears on the surface as if the former coke resources of the region are as yet but lightly drawn upon.

The rapid rise of by-product coking seemed destined to "put the Connellsville region out of business" as a coke producer. Demand for Connellsville coke, relative to potential production, has been falling off. It may have been carelessly assumed that since the region produced about 20,000,000 tons of coke in 1906 and 1907, and again in 1912 and 1913, with more than 21,000,000 tons in 1916, it could do much the same thing any time in future, should the iron industry have occasion to need the coke.

The fact is that the Connellsville ovens have dropped more or less into the position of taking the peak of the load in demand of blast furnaces. Many ovens merely exist on the ground. The requisite coal is no longer under them. A plant may have operated all its ovens years ago and now be able to operate only half of them.

The Connellsville *Courier* listed its maximum number of ovens just 15 years ago, 39,158 in 1909. Now it lists 34,250 ovens, but by no means are all these ovens potential producers. Some would require two or three months for physical reestablishment, in repairs, replacements and improvements. The requisite labor might not be obtainable. Many ovens could not operate, not having the coal.

The *Courier* report for the week ended Dec. 13, shows 141,260 tons of coke produced with 10,941 ovens active, leaving 23,309 inactive. If all those were potential producers, there would be indicated a reserve of 300,000 tons weekly production, equal to supporting 14,000,000 tons of pig iron production a year. The fact, of course, is very far from that. The Connellsville region can produce considerably more coke in the next few months than it is producing now, but it cannot produce anything like three times as much as it produced week before last, as the mere count of ovens would suggest.

The change in the Connellsville coke situation is of greatest importance to the iron foundries and steel foundries. There are two classes of Connellsville coke producers, the steel companies and the merchant coke operators. The region acts to take the peak of the load in coke demand, and the value of coke rises and falls sharply as trade conditions change. The steel companies absorb these changes, their chief supply being by-product coke. The merchant coke operators have widely varying prices, and many merchant blast furnaces must pay these prices. Accordingly, the price of pig iron is greatly affected, and may fluctuate more in future than in the past on this account. The furnace may have to pay a sharply increased price for its coke, and it may not be able to get coke at all on short notice, and thus merchant pig iron production may not increase as promptly as the buyer would expect.

Gain in Domestic Ferromanganese

EVIDENCE of the larger place in the steel industry which American producers of ferromanganese have attained is found in the import statistics for this year. Receipts of foreign ferromanganese in 1924 will not be more than half the 88,570 tons imported in 1923, whereas our production of ingots and castings this year will be only about 16 per cent less than last year's. The contrast is further emphasized by the fact that ferromanganese imports in 1913, at 127,200 tons, were practically double the rate this year and that in the pre-war year the steel production was only about 20 per cent less than that for 1924. As-

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suredly the tariff has been a factor in reducing importations, even though much of it is on manganese ore. Though foreign producers have met domestic quotations and at times gone below them, still domestic sales have been predominant. Before the war about 50 per cent of our consumption of ferromanganese came from abroad. At present the proportion is much less and the industry is on a stable basis. The importance of such a condition, particularly in a time of national emergency, cannot be exaggerated. Meanwhile domestic makers of ferromanganese would be in better position to meet British competition if they were able to import manganese ore free, or under a nominal duty, our limited deposits of high-grade ores being conserved as a measure of national defense.

Conservation of Oil

IT is to be hoped that success will attend the work of the oil conservation board, consisting of four Cabinet members, just created by the President. Just how the commission is expected to proceed is not outlined, though we are informed that it will "seek the full cooperation of the oil industry."

At President Roosevelt's conservation meeting in 1908 not a little was said that does not look sensible 16 years later. The error lies chiefly in assuming that things will have as great value to posterity as they have to the present generation. We may not exclaim with the mythical Irish member of Parliament, "What has posterity done for us!" but we may count upon posterity making improvements. It takes less labor today to produce a bridge capable of carrying a certain amount of traffic, using a 50 per cent iron ore, than it did in the days when an ore below 60 per cent was considered quite inferior. There was perturbation 20 years ago about the future supply of wooden railroad ties, but by raising timber and using preservatives the railroads are getting along very well. Providing themselves with wooden ties is merely one portion of their regular work.

Oil, as matters stand today, is in a category quite its own for three reasons. (1) The prospective supply, measured by years of duration, is very small. (2) Oil is being used in ways that are unnecessary, from the conservation standpoint, in that other things could and would be used if the cost of oil were a little higher. (3) Much production occurs, not on the basis of natural and legitimate demand but on the basis that the owner of the well rights must bring the oil to the surface or some one else is likely to get it.

The service performed by oil falls chiefly under three heads: Furnishing fuel, furnishing material for internal combustion engines and furnishing lubricants.

As to fuel, we are wasting oil when we use it where coal could be used. We have enormous reserves of coal, and improvements in mining and transportation that reasonably can be counted on should readily meet the necessity of mining thinner veins, and coal farther removed from points of consumption. In its fuel aspect, oil should be conserved for the use in which it is especially valuable, furnishing ocean transportation.

As to internal combustion engines, a big work lies ahead in taking care of automobiles, motor trucks and air transportation, but the prospects are promising. The amount of motor fuel furnished per unit of oil production is increasing and will continue to increase; automobiles improve in service rendered per unit of power generated, and by-product coking operations furnish an increasing supply. But it may not be possible to do the work as quickly as the limited future of oil production at our present rate may require.

A careful study might show that the item usually least thought of, that of lubricants, really furnishes the greatest threat. For lubricants we have no reasonable substitute. It is true we make improvements. Ball and roller bearings are saving much lubricant and will save more in future, but we use much lubricant for cutting and are likely to use much more in future.

From the physical viewpoint, conservation of oil is the easiest kind of conservation. The oil merely needs to be let alone. It is the ways of men that need to be changed, and that is very difficult, for we have laws and rights and our present wasting of oil is being done within them.

Efficient Railroad Operation

THE apparent ease with which the railroads made the new high monthly record of freight carrying in October is emphasized by *Railway Age*. Comparison is made particularly with conditions prevailing when the previous record was made, in August, 1920. In October the number of employees of the railroads was less by about 350,000 men, and the greatest amount ever handled in one month was taken care of substantially without car shortage. At the time of the 1920 record there was a shortage of about 120,000 cars, resulting in exasperating delays. Another comparison made by *Railway Age* is with the fall of 1922, when a sudden and very heavy increase in shipments followed the conclusion of the coal strike. This resulted in a car shortage which lasted several weeks, and reached a maximum of about 175,000 cars. The great increase in movement this fall was, except for that one case, without precedent and differed from it, as from the record of August, 1920, in being handled without car shortage.

Much of the high performance made in October may be attributed to three things: the average number of cars per train, 48.3, was the highest ever recorded; the average load of freight per train, 770 tons, was the highest ever known; the average daily movement of freight cars, 30.7 miles per day, equaled the previous high record in that particular. All of these elements helped and their cumulative effect produced the new mark for later railroad men to shoot at.

BOOM conditions are not in the offing and they are not wanted, though there is the impression that sellers have been pleased to have the topic so well aired after a long period of buyer supremacy in the markets. It is generally accepted that inflation with the attendant boom does not begin until the productive machinery of the

country is working substantially 100 per cent, when there is complete employment and there are repeated price advances. All manufacturing is not yet operating at capacity and the labor reservoir has not been exhausted. Caution is still the watchword and in steel, in view of advances to many of $5 to $10 a ton over current shipments, new buying is waiting on careful scrutiny of the rate at which various manufactures into which steel enters are going into consumption.

ENGLAND has had one life-saver this year in her shipbuilding and another in her railroads, transportation requirements filling in what otherwise would have been a great void in her iron and steel industry. As a single instance, the Tyne shipbuilding output in 1924 has been 274,557 tons register, compared with 120,499 tons last year. And two of the large railroad consolidations have announced heavy expenditures for rolling stock and maintenance, as reported in our cable dispatches from London in the past two weeks.

PULVERIZED coal burning under steam boilers has made such notable progress in the past year that a veritable combat has been staged in large steam power developments between the stoker and the powdered coal combustion apparatus. Apparently the engineering side of the powdered coal system has caught up to the commercial side, so that now it is a case of marshaling the armies of B.t.u.'s, the calculations of the ultimate use of the dollar in interest, operation and amortization charges, and the records of experiences outside the field of pure engineering. As was prophesied many moons ago, close attention is paid today to the conditions of combustion, where yesterday it was to the conditions of heat transfer and ebullition.

FRENCH PLANTS HAVE ORDERS

New Business Slow—Pig Iron Scarce and Market Active

PARIS, FRANCE, Dec. 9.—The French market remains stationary and no change is expected before the end of the year. Should a revival manifest itself now, it certainly would be hindered, first, by the sharp fluctuations of exchange; second, by the financial difficulties of industry in presence of the heavy calling in of funds from the Government, which may determine the Bank of France to raise its rate of discount from 6 to 6½ and even 7 per cent. Fortunately, the plants have substantial orders on hand; they are ready to meet the situation up to the second fortnight of January without looking for new work and this will prevent a decline of prices.

Coke.—The total amount of Ruhr coke received in November, on reparation account, was 174,138 tons, an average of 5800 tons a day, compared with 8500 to 9000 tons previously; the deficiency, partly covered from Nov. 18 to 30, is still 75,000 tons, expected to be fully covered this current month. In the first three days of December, arrivals were 39,046 tons.

Pig Iron.—Due to a shortage of available supplies, the market remains active both at home and at export. The output of foundry iron in October was only 126,927 tons, against 134,630 tons in September. Prices are unaltered at 305 to 310 fr. per ton ($16.17 to $16.44 per gross ton) (at furnace); a founders' cooperative association, dealing on large contracts, is asking 298.50 fr. per ton ($15.83) for iron yielding 3 to 3½ per cent of Si. In the East and North, prices stand. The output of forge iron is increasing and it sells at a price similar to that of foundry iron. Hematite is steady at 420 fr. a ton ($22.27), a few francs above or under that price, according to tonnage. The British price of 72 to 74s. f.o.b. Antwerp (310 to 318 French francs or $16.44 to $16.86) may be considered unattractive, even with exchange of sterling at 86 fr. French exports of hematite to Italy are decreasing.

Ferroalloys.—The Comptoir prices are unaltered in December. On the open market, they stand as follows: ferro-silicon, 10 to 12 per cent, 610 fr. ($32.35); 25 per cent, 865 fr. ($45.87) delivered; 45 per cent, 1000 fr. ($53.04); ferromanganese, 1425 fr. ($75.57) delivered; spiegeleisen, 10 to 12 per cent Mn., 550 to 560 fr. ($29.17 to $29.70) delivered. Foreign competitive prices are: ferromanganese, £14 or $65.80 (British); £13 to £13 10s. or $61.10 to $63.45 (Swedish); ferrosilicon 45 per cent, £11 ($51.70); 75 per cent, £17 or $79.90 (Norwegian); ferrosilicon 75 per cent, 430 fr. or $83, delivered Basle (Swiss).

Semi-Finished Products.—Fresh business is limited, but tne firmness of the market is assured by the large commitments of the plants. Delivery times are variable. Many plants are working for either their own steel-works or subsidiaries. Current quotations are as follows: Basic blooms, 42 to 43 fr. ($22.27 to $22.80); Billets, 44 to 46 fr. ($23.33 to $24.40); largets, 47 to 49 fr. ($24.92 to $26.). The export market is weaker and prices generally at: £5 to £5 1s. 6d. ($23.50 to $23.85) for blooms; £5 4s. 6d. to £5 6s. ($24.44 to $24.91) for billets; £5 7s. to £6 7s. ($25.15 to $29.85) for largets.

Rolled Steels.—Conditions are less cheerful, fresh buying subdued and prices slightly weaker. Current quotations are: beams, 47 to 49 fr. or 1.15c. to 1.20c. per lb. (East and Lorraine); 50 fr. or 1.22c. (North); merchant steels, 51 to 54 fr. or 1.25c. to 1.32c. (average). Less activity for export, due partly to the Germans quoting extremely low rates. Belgian plants are stated to have booked an interesting amount of orders in the United States. The principal quotations, f.o.b., are: £5 12s. 6d. to £5 15s. (1.18c. to 1.21c.) for beams; £5 17s. 6d. (1.23c.) for bars.

Sheets.—The heavy sheet section is quiet; prices vary from 65.50 to 66.50 fr. (1.60c. to 1.63c.) lowest quotation, to 70 to 72 fr. (1.71c. to 1.76c.) highest (at works). Boiler sheets are obtained at 10 fr. higher. Medium and light sheets are better at 90 to 92.50 fr. and 100 to 110 fr. (2.20c. to 2.26c. and 2.44c. to 2.69c.) respectively. British close annealed soft black sheets are offered at 157.50 fr. (3.85c.) for the 0.4 mm. (No. 27 gage) 146 fr. (3.57c.) for the 0.5 mm. (No. 25½ gage); 134.50 fr. (3.29c.) for the 0.8 gage (No. 22 gage) delivered Paris area.

Foundry.—The situation is rather satisfactory. Some plants are said to be short of pig iron supplies.

French Foreign Trade Shows Heavy Increase in Both Exports and Imports of Iron and Steel

PARIS, FRANCE, Dec. 9.—The latest statistics available for the iron and steel industry during the first ten months of 1924 contain the following items:

Imports of pig iron were 36,957 tons (as against 42,850 tons for the corresponding period of 1923) and the exports were 617,155 tons (against 483,753 tons in 1923.) In ferroalloys, France imported 8428 tons, as against 4502 tons, and exported 15,364 tons, compared with 17,813 tons in the same period of 1923. The imports of iron and steel were 585,096 tons against 456,933 tons. Exports of iron and steel were 1,836,564 tons against 1,485,282 tons.

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Steels Used by American Railroads

Modern Locomotives and the Steel in Them—Steel Rails of Today—Three Authoritative Addresses Before Steel Treaters

A PROGRAM somewhat unique and of unusual interest was carried out by the New York Chapter of the American Society for Steel Treating at its monthly meeting on Wednesday evening, Dec. 17. The general subject was "Railroad Steels Used by American Railroads." Three recognized authorities in their particular fields delivered 30-min. addresses followed by a general discussion.

"Steel for Rolling Stock, Particularly Locomotives and Cars," was discussed by Lawford H. Fry, metallurgical engineer, Standard Steel Works, Burnham, Pa., a subsidiary of the Baldwin Locomotive Co., and a large producer of heavy engine castings, forgings, tires, wheels and axles. The second speaker was C. B. Bronson, assistant inspecting engineer of the New York Central Lines, Grand Central Terminal, New York, who for a number of years was closely associated with the late Dr. Dudley and who is now pursuing much of the work on the production of high-grade rails started many years ago by his chief. His subject was "Steel for Permanent Way, Particularly Rails and Bridges." The third address was by James E. Howard, who took as his topic "General Requirements of the Railroads." Mr. Howard, who is engineer-physicist of the Interstate Commerce Commission, Washington, is well known for his many contributions to metallurgical literature in general and particularly for his investigations of the causes of faulty metal. Liberal extracts are given.

Steels for Rails and Track Supplies

Fundamentals in the Rail Problem—The Sandberg Rail—Heat-Treated and Alloy Steels

BY C. B. BRONSON

AMONG steel materials for permanent way the steel rail is the most important and has been the subject of much discussion. Decidedly important progress, however, has been made in the past two or three years and several changes and innovations have been instituted.

Heavier rails are coming more and more into widespread use. Eastern trunk lines are now using the 125 to 136-lb. rail, while Western roads are using the 90 to 110-lb. rail. In some cases even the 130-lb. rail is in use. The initial cost of these heavier rails is more than offset by operating and maintenance economies. This is due to the longer life, resulting in less frequent maintenance and tamping, as well as less disturbance of ties, ballast and roadbed.

The 39-Ft. Rail

The standard rail length has been increased to 39 ft. and the bulk of the tonnage for next year is being made to this length. The demand for the 39-ft. rail arose from several causes, principally battered ends, high maintenance cost of rail ends, end breakages and suspended joints. With a supported joint and a long bar, battering largely disappears, accompanied by reasonable maintenance. Our own system is to use the 38-in. bar supported by three ties.

The experimental use of higher silicon in rail steel is a recent development. The old minimum of 0.10 per cent silicon is being replaced experimentally by a rail containing 0.20 per cent silicon. This places rail steel on a plane with that for wheels, tires, automotive and other high-grade steels. One object of the experimental change is to secure cleaner steel at low cost and it is considered that the more solid and cleaner steel is desirable even at the sacrifice of increased depth of pipe.

The general practice is being followed of separating "A" rails and high-carbon heats. The "A" rail, coming from the topmost part of the ingot, often contains excessive segregation and the surface of these rails is restricted to tangents, or to slow speed, light traffic territory. Heats on the high side of a specified carbon range are being selected for curve service. The old practice was to mix rails regardless of position in the ingot or the amount of carbon. Separating them should increase their life on the average and tend to reduce failures of certain types.

Four Factors in the Rail Problem

The rail problem consists of four fundamentals: Design of section, adjustment of position, failures in service, and wear.

Design of Section: Design is largely of two types:

1—Thick base deep head and low fishing depth for a given weight. This type requires the use of carbon approaching the eutectoid percentage for 130-lb. rails. A strange effect is that the Brinell hardness of the 100-lb. rail containing 0.68 per cent carbon is higher than that of the 130-lb. rail containing 0.35 per cent carbon. The effect of roll pressures is limited and the annealing of the rail head on the hot bed is increased, or its cooling is retarded.

2—The second type has a broad, thin head and moderate thickness of flange, with a maximum fishing depth. The sections on our road are all of this type, even the 127-lb. sections. This results in a well-worked head in rolling and in grain refinement, the carbon being held to 0.75 per cent maximum in the heaviest section.

Breakages: In certain types breakages have decreased materially. Base and web failures where they occur have been fewer. Head failures predominate. The number of fissures has not materially decreased, though the rate per 100 miles of open-hearth steel in service is now about half of that seven or eight years ago. The product of certain mills is almost immune from this type of failure and this statement is corroborated by the experience of several heavy traffic railroads.

Wear: There are two types of wear: That on tangents and on curves. The present carbon steel rails have ample resistance for tangent wear and heat-treated rails are not needed there. A top wear of 3/32 in. occurs in eight years under heavy traffic. Most roads remove tangent rails for battered ends, especially those using short bars and suspended joints. Wear on sharp curves calls for special consideration and here the problem of the heat-treated and alloy steel rails enters. A variety of such steels has been tried in the last 20 years or more, such as nickel, nickel-chromium,

high-carbon, low-carbon and high-manganese. The addition of copper to standard steel has been suggested as well as the use of vanadium or chrome-vanadium.

The Sandberg Treated Rail

There has been some use of oil or water-quenched low-carbon steel rails, manganese steel, and the Sandberg air-treated rail. Most of the alloy steels have been abandoned due to breakage, cost, or for economic reasons. The high manganese, low-carbon and the copperized rail steel are still under test. Oil or water-quenched carbon steels for rails are not attractive, but the 12-per cent manganese steels are very successful. Their life is about 10 times the open-hearth and no breakages occur except hair cracks from the heating of the driving wheels. The Sandberg process is quite promising and the increase in the life of the rail more than offsets the extra charge for treatment. Their wear is less than plain open-hearth steel, but much greater than on manganese steel rails. The process might be further improved by inverting the rail and by spraying the surface of the head with oil to secure greater toughness and resistance to wear.

Aside from the question of treatment, the most important problem is to secure open-hearth steel with less segregation and greater cleanliness. Hot tops are worth considering.

Heat-Treated or Special Steel Parts

Some of the other materials which are heat-treated or are made of special steel for service in permanent way are the following:

Oil treated splice bars and track bolts. In these the elastic limit is raised to 80,000 lb. per sq. in. with the tensile strength elevated to 120,000 lb. per sq. in. This overcomes the notch effect on the head of splice bars due to rail ends digging into the splice bar and materially reduces bar failures. The increased physical properties are desirable in bolts and prevent stretching as well as keep the joints tight.

In a new process for reclaiming splice bars the fishing depth of old bars is renewed by pressing. This restores the fish and prevents the distortion of holes. Provision is made to give old bars an oil quench. Plain annealed bars can thus be increased in strength.

The use of copper in tie plates has increased and after seven years' experience their life is materially augmented. Copper is now being specified in steel for spikes where corrosion is excessive combined with throat cutting.

The corrosion of track material from the brine dripping from refrigerator cars is a serious matter and the deterioration of metals has been considerably hastened. Some railroads are oiling rail and track fixtures and our own organization has oiled some 35,000 miles this year.

Heat treatment is applied to a great variety of other track fixtures, such as nut locks, rail anchors, guard rails, braces, switch stand parts, scales, bearings, etc. There is a large field for further application of heat treatment to track fixtures and parts. It is important to secure a tough material to resist the effect of shocks and impacts of high speeds. The belief of the speaker is that in most cases a simple treatment applied to plain carbon steel furnishes all the essentials of strength and toughness combined with rigidity. The so-called fancy steels are to be avoided.

Special Rails and Heat Treatment

The experience with special rails has not generally been successful. Treatment of rails is only necessary for resistance to wear on sharp curves and the treatment of the head is all that is required. The softness of the rail section can be made adequate by a design which shall limit the stresses in the base of the web to low values. A modified Sandberg treatment should yield increased surface value in the wear portion of the rail head.

With traffic and loads on the increase, constant study is necessary to determine the most suitable material. Manufacturers, technical organizations and the railroads themselves are all striving for improvement. Cooperation has been excellent and progress has been beyond the expectations of many, if records of many years previous are delved into.

Steels Used in Locomotives

The Engine of Today and 30 Years Ago—Steel for Boilers, Frames, Springs and Forgings—Alloy Steels

BY LAWFORD H. FRY

MY task this evening as set by your program committee is to open a discussion on locomotive steels, and half an hour's time has been allotted to me. As an exercise in condensation this comes close to the standard set by the philosopher who said that a man was not thoroughly familiar with his subject until he could write all that he knew on a single half sheet of paper. I am afraid that I can hardly reach this rigid requirement, and even in half an hour details must be omitted.

Structure of the Locomotive

First let us analyze the locomotive from a structural point of view and then consider the various steels entering into the details of the structure. A locomotive has three main structural components:

1. *The boiler.* 2. *The chassis.* 3. *The engines.*

The boiler with its contained firebox and flues is a comparatively simple structure from the point of view of the steel used.

The chassis normally consists of two longitudinal frames of cast steel tied together by cast steel crossties. Trucks which may be applied front and back are also largely built up of steel castings. The running gear proper consists of driving wheels having cast steel centers on forged steel axles with rolled steel tires. Truck wheels are usually of solid rolled steel for the front and steel tired cast steel centers for the trailing wheels. Between the frame and axles come the springs.

The engines, with the exception of the cast iron cylinders which do not concern us, are made up of steel forgings for main and connecting rods, pistons, piston rod, valve motion and crank pins.

I leave the tender out of consideration, and merely mention in passing what may be called the supernumerary structure such as cab and running boards which are built of structural steel.

With this list of the parts established let us group the parts according to the carbon content of the steel used:

1. About one per cent carbon: Springs.
2. About 0.75 per cent carbon: Tires and rolled wheels.
3. About 0.50 per cent carbon: Main forgings such as rods and driving axles.
4. About 0.25 per cent carbon: Steel castings.
5. Less than 0.20 per cent carbon: Boiler plate and flues and certain special truck and tender frame castings.

Let us take up the various steels and give them more detailed consideration. In doing this I propose to consider not only modern practice, but to contrast this with the older practice out of which it has developed. In this way we get an idea of the direction

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in which growth has taken place, and are better prepared to look into the future.

Freight Engines Now and 30 Years Ago

To simplify comparisons let me call to your attention two Pennsylvania Railroad locomotives which have both been, with an interval of about 30 years between, the heaviest standard freight locomotives of the Pennsylvania System. The earliest of these is the class H3a consolidation or 2-8-0 type, originally class R, which was built about 1893 and weighed about 126,000 lb. in working order. The modern example is the class I1s of the 2-10-0 or decapod type which weighs in working order about 389,000 lb. The weight is about three times as great as it was 30 years ago. By comparing these two engines we can follow the growth in dimensions as well as the change in material of construction.

Boiler: The boiler of the modern I1s locomotive weighs about 50,000 lb. without flues, and about half as much again with flues and superheater. The largest plate measures 269 in. x 90 in. by 1⅛ in. thick and weighs about 8750 lb. The largest plate of the old H3a boiler measured 191 in. x 83 in. by 7/16 in. thick and weighed about 1750 lb. So far as material is concerned there has been little change in the 30 years. The specifications now, as then, call for a tensile strength of 55,000 to 65,000 lb. per sq. in. For plates to be flanged a nick and bend test is required.

Locomotive Frames

Steel Castings: There has been a very considerable development in the use of steel castings in the period we are considering. Thirty years ago the locomotive frames were of wrought iron welded together and cross ties were largely built up of structural material. Driving wheel centers were of cast iron. Today these parts are all of cast steel. The frames of the I1s are castings 44 ft. 9 in. long, weighing about 22,000 lb. each. Driving wheel centers and crossties are of cast steel, and altogether there are about 50 tons of steel castings in the locomotive. The majority of locomotive castings are purchased to have a minimum tensile strength of 60,000 to 70,000 lb. per sq. in.

Finality has by no means been reached in the manufacture of locomotive steel castings. Designers are aiming more and more at combining what used to be many castings into a single casting. A good example is the trailer truck frame. Tender frames are also cast complete in one piece. The most recent development is to cast a complete pair of locomotive frames together with crossties as a single unit. This bold attempt is still in the experimental stage, but it represents an advance along lines already well established. Such complicated castings are made of a low carbon steel, usually about 0.17 per cent, so that they can be used without annealing which would bring excessive warping.

Steel for Springs and Tires

Springs: There has been little development in 30 years, except in size. At present attention is being given to the question of improvement in springs. To carry out such improvements exact data as to the service being given by locomotive springs are required. If this is accumulated by the railroads and better springs are demanded, steel makers and steel treaters will respond. The large majority of locomotive springs are made of a plain carbon steel having about 1 per cent of carbon and low silicon and manganese. The steel is quenched from the fitting temperature and removed from the oil which is still so warm that a separate draw is not required. Some railroads are using a steel with from 0.25 to 0.50 per cent silicon and a few of the more progressive roads are looking to the use of modern accurate methods of heat treatment.

Tires: Locomotive tires stand in the rather remarkable position of showing practically no change in either size or material in 30 years. The width of the tire is limited by well established clearances and rail designers. Flanged tires are 5½ in. wide. The thickness varies of course during the life, wearing from 3 or 3½ or in some cases 4 in. to about 2 in. at the scrapping limit. The material is practically the same:

Passenger tires—0.50 to 0.70 per cent carbon with a minimum tensile strength of 105,000 lb. per sq. in.
Freight tires—0.60 to 0.80 per cent carbon with a minimum tensile strength of 115,000 lb. per sq. in.
Switch tires—0.70 to 0.85 per cent carbon with a minimum tensile strength of 125,000 lb. per sq. in.

The manufacture and use of rolled steel wheels for engine and tender trucks have developed in the last 20 years. The steel used is practically the same as is used for freight service tires.

It is worth noting that the tires seem to put a limit beyond which locomotive sizes cannot be carried. For the last 30 years, and probably for even longer, short-sighted prophets have proclaimed that locomotives could be made no larger. Apparently there is in sight a definite limit which will prevent the weight of locomotives from continuing to grow indefinitely.

A limit to the weight which can be carried by a locomotive wheel is set by the area of contact between tire and rail. This area of contact cannot be easily increased, and with this fixed the load which can be carried is limited by the crushing strength of the steel in the tires and rails. Up to 35,000 lb. is now carried on some individual driving wheels and this cannot be greatly exceeded without failure of the steel. The continued growth in wheel loads, which are now two and a half times what they were 30 years ago, while the size of tires and the composition of the steel have remained unaltered, makes it necessary to give greater care to maintenance if the tire failures are to be avoided. Owing to the slight but not negligible permanent distortion produced in both tires and wheel centers by heavy loads, tires should not be removed from wheel centers for turning. Shimming should be avoided where possible, and when shims are used they should be made of new material of known and uniform thickness. Shims should be applied in as few pieces as possible with no overlaps and with gaps between ends of not over 1/16 in.

Locomotive Forgings

Forgings: The desirability of securing lightness in moving parts has led some designers to use special heat-treated steels for the valve motion. This practice is undoubtedly destined to grow. The heavy duty parts such as main and side rods, driving axle and crank pins claim our more direct attention. The steels commonly used for these parts are:

Quenched and tempered chrome nickel.
Quenched and tempered vanadium.
Quenched and tempered carbon steel.
Normalized carbon vanadium.
Annealed carbon steel.

The quenched and tempered alloy steels offer the greatest strength, and for this reason are used where lightness is essential. They have the drawback that if quenched and tempered parts are heated in the course of locomotive repairs the strength is lost. The same is true of the quenched and tempered carbon steels which have less strength and cost less than the alloy steels.

Carbon-Vanadium for Forgings

It is often a serious disadvantage to a railroad to have quenched and tempered forgings which the repair shop is not equipped to handle. To supply strength without the necessity for quenching, normalized carbon vanadium steel has been developed and has been widely used. By increasing the manganese content from say 0.60 per cent in the ordinary carbon steel up to say 0.90 per cent in the carbon vanadium, the tensile strength is increased from say 85,000 to 100,000 lb. per sq. in. The addition of vanadium makes the steel respond to heat treatment so that a fine structure and good ductility are readily obtained. The treatment given usually consists in heating to 1600 to 1650 deg. Fahr. a draw at about 1150 deg. Fahr. Such steel can be handled in any well-equipped railroad smith shop

(*Continued on page* 1713)

Great Britain Quiet for Holidays

Blast Furnaces Being Relighted—German Semi-Finished Steel "Trust" Formed—Labor Troubles Worry Belgium

(By Cable)

LONDON, ENGLAND, Dec. 22.

PIG iron is quiet on the near approach of the holidays but increased activity is anticipated in the new year. Prices of Cleveland grades are rather easier, on quiet tone, but the position generally is firmer. Millom & Askam Hematite Iron Co., Ltd., has blown in an additional furnace, making 14 now operating out of 39 on the Northwest Coast. East Coast hematite is steady and makers are prepared to relight their furnaces in January.

Foreign ore is quiet. Bilbao Rubio is held at about 22s. 6d. ($5.28), c.i.f. Tees.

Finished steel is quiet and likely to remain so until after the holidays. Export demand generally is poor.

Shipbuilding output on the Tyne this year consists of 65 vessels of a total of 274,557 tons gross register, against 20 vessels of 120,499 tons in 1923.

Sheet and Tin Plate

Tin plate demand is considerably improved, from both domestic and export sources, and some fair sales have been made to Far Eastern markets for January and February shipment.

Galvanized sheets are quiet but steady.

Black sheets are in moderate demand for Japanese specifications and some business is passing, mainly in thick-gaged sheets.

On the Continent of Europe

Continental markets are uncertain and works generally are not anxious to book orders, pending the holidays, but some merchants are willing to sell at low figures. In general, demand is poor.

Belgium fears a lockout at the end of December.

In Germany a semi-finished steel trust has been constituted which will function from Jan. 1. Other trusts, for bars, rails, plates, shapes, etc., are nearing completion.

The Stahlwerk Becker, A. G., at Krefeld, Rheinland, has resumed operations on a small scale.

British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.70 per £1, as follows:

Durham coke, del'd	£1	5s.				$5.87		
Bilbao Rubio ore†	1	4				5.64		
Cleveland No. 1 fdy	4	6				20.20		
Cleveland No. 3 fdy	4	1½				19.14		
Cleveland No. 4 fdy	4	0½				18.91		
Cleveland No. 4 forge	4	0				18.80		
Cleveland basic	4	0				18.80		
East Coast mixed	4	8½	to £4	9s.		20.78	to	$20.90
East Coast hematite	4	19	to 5	0		23.26	to	23.50
Ferromanganese	14	0	to 14	15		65.80	to	69.32
*Ferromanganese	14	0	to 14	15		65.80	to	69.32
Rails, 60 lb. and up	8	10	to 9	0		39.95	to	42.30
Billets	7	0	to 8	0		32.90	to	37.60
Sheet and tin plate bars, Welsh	8	7½				39.36		
Tin plates, base box	1	3½				5.52		
						C. per Lb.		
Ship plates	9	0	to 9	10		1.89	to	1.99
Boiler plates	13	0	to 13	10		2.73	to	2.83
Tees	9	2½	to 9	12½		1.91	to	2.02
Channels	8	7½	to 8	17½		1.76	to	1.86
Beams	8	2½	to 8	12½		1.70	to	1.81
Round bars, ¾ to 3 in.	9	7½	to 9	17½		1.97	to	2.07
Galv. sheets, 24 gage	17	5	to 17	10		3.61	to	3.67
Black sheets, 24 gage	12	10	to 12	15		2.62	to	2.67
Black sheets, Japanese specifications	15	5				3.20		
Steel hoops	10	15	and 12	10*		2.25	and	2.62*
Cold rolled steel strip, 20 gage	16	0				3.36		

*Export price.
†Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

Foundry pig iron: (a)								
Belgium	£3	13½s.	to £3	14s.		$17.27	to	$17.39
France	3	13½	to 3	14		17.27	to	17.39
Luxemburg	3	13½	to 3	14		17.27	to	17.39
Basic pig iron: (a)								
Belgium	3	12½	to 3	13		17.03	to	17.15
France	3	12½	to 3	13		17.03	to	17.15
Luxemburg	3	12½	to 3	13		17.03	to	17.15
Billets:								
Belgium	5	2½	to 5	5		24.08	to	24.67
France	5	2½	to 5	5		24.08	to	24.67
Merchant bars:						C. per Lb.		
Belgium	5	15				1.21		
Luxemburg	5	15				1.21		
France	5	15				1.21		
Joists (beams):								
Belgium	5	10				1.15		
Luxemburg	5	10				1.15		
France	5	10				1.15		
Angles:								
Belgium	5	17½	to 6	0		1.23	to	1.25
⅛-in. plates:								
Belgium	7	0				1.46		
Germany	7	0				1.46		
⅜-in. ship plates:								
Luxemburg	7	0				1.46		
Belgium	7	0				1.46		

(a) Nominal.

British Iron and Steel Works Still Hampered by Excessive Costs

LONDON, ENGLAND, Dec. 11.—Generally speaking, iron trade conditions are less favorable than recently, but this may be due to the incidence of the dull period which invariably precedes the end of the year and the accompanying stock taking period. There are no important accumulations of iron in makers' yards, and of course the warrant stores, which in pre-war days formed such a valuable and important reserve, are today non-existent. Whether they will ever again resume their former very useful function remains to be seen, but it must be admitted that the day seems to be far off when they will be re-established.

Present output is today going pretty well into consumption and the outlook is regarded with some small degree of optimism, even though things are none too bright today. Just now there is some talk of putting one or two fresh furnaces in blast in Cleveland on foundry metal, while of late hematite has worked itself into a little better position, stocks having been reduced considerably. The great obstacles with which makers are faced are the excessively high cost of fuel and the monstrous railroad rates and national and local taxation.

Unless there can be a substantial modification of these, it is impossible for manufacturers to get down their selling prices, which stand far above the level of Continental works, whose costs are relatively low. It is this disparity between our price and those of our Continental competitors that is arousing the chief anxiety felt by British manufacturers, but probably economic forces will come into play by slow degrees to raise costs abroad and thus tend to adjust matters more nearly. The process, however, must be slow and will need a lot of patience.

Railroad Orders and Tin Plate

The last week or so has seen quite a burst of activity in order-placing by some of the big railroads, extensive orders for equipment having been released and considerable permanent-way renewals being under consideration.

This week the fate of the Tin Plate Stabilization Scheme is to be decided. Under-selling by certain works, discontent with the way in which the chief group of makers allocates orders among its constituent units and the shipping to France and Norway of big quantities of plate on consignment are the chief friction points. There was an acrimonious meeting last week in Swansea, which was adjourned, and the matter is now due for settlement. If the stabilization scheme goes, there will be a cut of shillings in prices which are far too high. We shall know the worst in a few days.

For Contents of This Issue See Orange Insert

American Coke Output Analyzed*

Furnace and Non-Furnace Ovens—Coke Used in Making Pig Iron—By-Product and Beehive Compared

IN the Connellsville beehive coke region distinction has long been made by the coke trade between the "merchant" operators and the "furnace" operators. As the name implies, the furnace interests are those affiliated with the producers of iron and steel, whose output ordinarily does not enter the open market. A similar distinction may well be made in the by-product coke industry, though here it is not always easy to classify a particular plant. Plants owned directly by steel companies and operated under the same corporate name are unmistakably furnace plants. Plants such as the New England Fuel & Transportation Co.'s works at Everett, Mass., are plainly comparable to the merchant beehive coke plants. But there are other plants not owned by furnace operators whose output of coke, nevertheless, goes under contract to near-by iron makers and whose activities are therefore very closely intermingled with those of the iron and steel industry.

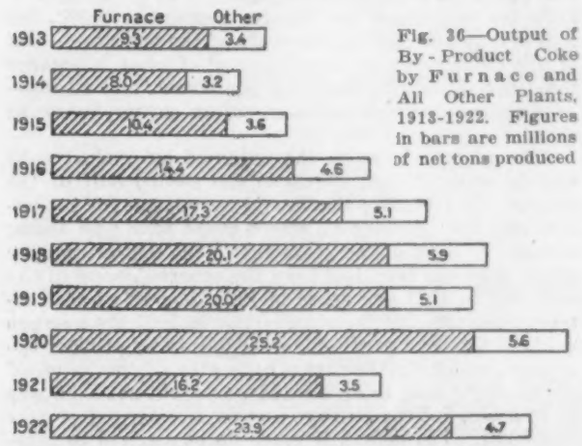

Fig. 36—Output of By-Product Coke by Furnace and All Other Plants, 1913-1922. Figures in bars are millions of net tons produced

In Tables 9 and 10 and Fig. 36 the term "furnace plant" includes not only coke ovens directly owned and operated by makers of iron and steel, but also those independent plants whose entire output is sold under contract to blast furnaces. The term "other plants" is not exactly equivalent to the "merchant plants" of the beehive coke industry. Many of the non-furnace by-product coke plants have a relation with some other manufacturing industry, such as the production of alkali, or are tied by contract to distributors of city gas in a way that prevents them from planning their operations with regard to the coke market alone. For this reason the term "other plants" is here used in preference to "merchant plants."

Contrary to an impression commonly prevailing, the furnace plants have been growing more rapidly both in numbers and in output than the non-furnace plants. In the 10 years 1913 to 1922 the number of non-furnace by-product plants rose from 15 to 21, but the number of furnace plants more than doubled, rising from 21 to 43 (Table 9).

The growth of the furnace branch of the industry is even more striking, as measured by the record of production. The output of plants associated with city gas and manufacturing enterprises rose from 3,368,000 tons in 1913 to 4,661,000 tons in 1922, an increase of 38 per cent, but during the same period the output of the furnace plants nearly trebled, rising from 9,347,000 to 23,890,000 tons. In 1923 the furnace plants contributed 73.5 per cent of the total output of by-product coke; by 1922 their proportion had risen to 83.7 per cent. The share of the other plants declined correspondingly, from more than a fourth to barely a sixth of the whole.

The statistics also fail to bear out the contention that the non-furnace plants, as a group, operate more steadily than the furnace plants. During 1920, for example, when the market was active, the furnace operators produced 81.8 per cent of the annual whole. Their share in the succeeding year of depression, 1921, was 82.2 per cent. Thus instead of decreasing during a depression, as might have been supposed, the percentage

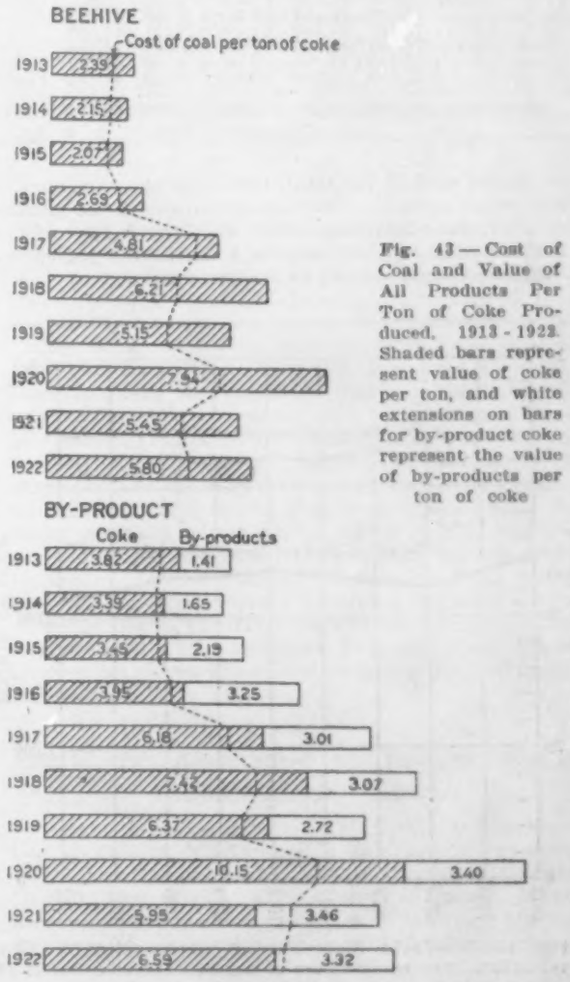

Fig. 43 — Cost of Coal and Value of All Products Per Ton of Coke Produced, 1913-1922. Shaded bars represent value of coke per ton, and white extensions on bars for by-product coke represent the value of by-products per ton of coke

Table 9—Number and Production of By-Product Coke Plants Connected With Iron Furnaces, 1913-1922

Year	Number of Plants		Coke Produced (Net Tons)		Percentage of Production	
	Furnace	Other	Furnace	Other	Furnace	Other
1913	21	15	9,346,855	3,367,845	73.5	26.5
1914	23	14	8,029,727	3,190,216	71.6	28.4
1915	24	16	10,448,015	3,624,580	74.2	25.8
1916	29	17	14,446,576	4,632,785	75.8	24.2
1917	33	19	17,321,145	5,118,135	77.2	22.8
1918	39	21	20,124,218	5,873,362	77.4	22.6
1919	43	22	20,019,097	5,115,524	79.6	20.4
1920	45	23	25,212,746	5,621,206	81.8	18.2
1921	45	22	16,231,374	3,518,206	82.2	17.8
1922	43	21	23,889,702	4,660,843	83.7	16.3

*From the advance proof sheets of a report, "Coke and By-Products," by F. G. Tryon, United States Geological Survey, Washington.

of the total output contributed by furnace plants actually increased.

Even when measured monthly (Table 10) the relative proportions of furnace and non-furnace coke have been remarkably constant during the last three years. The furnace plants have consistently produced from 80

Table 10—Average Daily Production of By-Product Coke by Plants Associated With Iron Furnaces and by All Other Plants, 1920-1922, Net Tons

Average Daily Production	1920 Furnace Plants	1920 Other Plants	1921 Furnace Plants	1921 Other Plants	1922 Furnace Plants	1922 Other Plants
January	62,500	15,800	60,600	12,300	50,200	10,700
February ...	67,500	16,100	55,000	11,800	53,600	10,700
March	69,200	16,100	46,100	10,600	57,400	11,500
April	61,200	14,300	40,300	9,900	61,500	12,000
May	63,500	13,900	41,200	9,600	70,200	11,900
June	68,200	14,700	38,400	8,100	74,100	12,400
July	70,700	15,000	33,600	7,800	69,400	11,300
August	72,500	15,900	36,700	7,500	47,200	11,600
September ...	74,100	17,300	39,400	7,600	62,000	13,000
October	76,400	17,600	46,600	8,900	75,600	15,100
November ...	72,400	16,900	49,200	9,200	81,200	16,500
December ...	67,200	14,300	50,500	9,000	82,100	16,900
Average ...	68,600	15,600	44,800	9,300	65,400	12,800

to 84 per cent of the total, with only one exception in the period covered. That exception was in the months of May, June and July, 1922, when the failure of the beehive coke supply from the Connellsville region induced maximum activity at furnace plants.

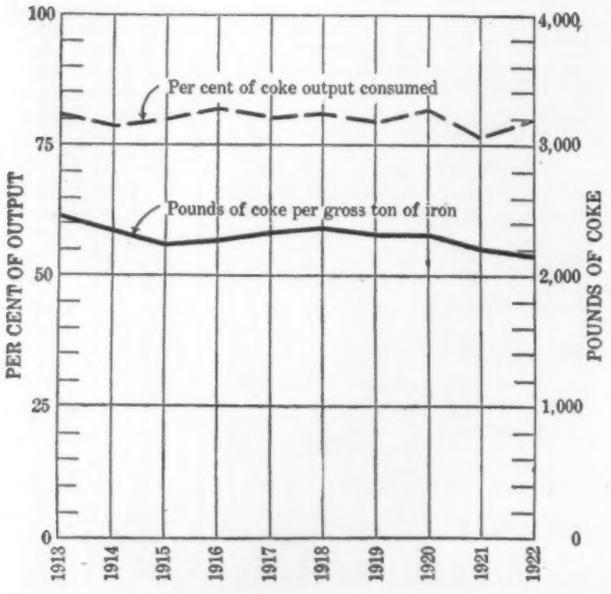

Fig. 45—Trends in Blast Furnace Consumption of Coke, 1913-1922. The manufacture of pig iron consumes about 80 per cent of the total quantity of coke with surprising regularity. The quantity of coke consumed per gross ton of iron produced has been declining since 1918

The analysis shows that the same forces that bring about curtailed production among the group dependent on the steel industry are active in the non-furnace plants. The demand for city gas is clearly much more constant than the demand for furnace coke, but it also is affected by the ebb and flow of general business, and the requirements of other industries play sufficient part in the market for the output of the non-furnace group of by-product operations to introduce into their curve the same typical changes that are present in the furnace curve.

Cost of Coal and Value of Products

The average value of the coke produced is compared with the cost of the coal per ton of coke in Table 29 and Fig. 43. Thus in 1922 the value of beehive coke per ton as reported by the operators was $5.84, while the cost of the coal charged in the ovens per ton of coke drawn

Table 11—Percentage of Total Monthly Output of By-Product Coke that Was Produced by Plants Associated With Iron Furnaces and by Other Plants, 1920-1922

Month	1920 Furnace	1920 Other	1921 Furnace	1921 Other	1922 Furnace	1922 Other
January	79.8	20.2	83.1	16.9	82.4	17.6
February	80.7	19.3	82.3	17.7	83.3	16.7
March	81.1	18.9	81.3	18.7	83.3	16.7
April	81.1	18.9	80.3	19.7	83.7	16.3
May	82.0	18.0	81.1	18.9	85.5	14.5
June	82.3	17.7	82.6	17.4	85.7	14.3
July	82.5	17.5	81.2	18.8	86.0	14.0
August	82.0	18.0	83.0	17.0	80.3	19.7
September ...	81.1	18.9	83.8	16.2	82.7	17.3
October	81.3	18.7	84.0	16.0	83.3	16.7
November ...	81.1	18.9	84.2	15.8	83.1	16.9
December	82.5	17.5	84.9	15.1	82.9	17.1
	81.4	18.6	82.7	17.3	83.6	16.4

was $4.05. It must not be assumed that the margin of $1.79 between these two figures represents profit, for coal is only one item of the costs of the operators. Out of this difference must come the cost of labor, allowance for depreciation of plants and equipment, and all overhead charges, as well as taxes, before any profit can be shown.

The margin between the value of by-product coke and the cost of coal, shown in the second half of the diagram, is extremely small, and were it not for the by-products the operator of retort ovens would be losing money. In most of the years shown the cost of coal per ton of coke has been less than the reported value of the coke, but in 1921 and again in 1922 the cost of coal exceeded the value of the coke. Thus in 1922 the average value of the coke produced, according to by-product operators, including their own estimates of the value of the quantity used in associated works but not sold, was $6.59 a ton, but the average cost of coal per ton of coke was $6.81. The deficit, if made up at all, had to come from the by-products, which had a value that year of $3.32.

The total value of all products was $9.91 per ton of coke produced, leaving a difference between the value of products and cost of coal of $3.10. Though larger than in 1921 this was smaller than in any other year since 1915. It must be emphasized again that this difference between value of products and cost of coal is not profit, and the deductions for capital charges in the manufacture of by-product coke are of course very much

Table 29—Cost of Coal and Value of All Products Per Ton of Coke Produced, 1913-1922

[All figures reduced to value per ton of coke produced]

	Beehive Coke			By-Products Coke				
Year	Value of Coke Per Ton [a]	Cost of Coal	Excess, Coke Over Coal	Value of Coke Per Ton [a]	Value of All By-Products	Total Value of Products	Cost of Coal	Excess, Products Over Coal
1913	$2.39	$1.75	$0.64	$3.82	$1.41	$5.23	$3.27	$1.96
1914	2.15	1.67	.48	3.39	1.65	5.04	3.19	1.85
1915	2.07	1.61	.46	3.45	2.19	5.64	3.24	2.40
1916	2.69	1.96	.73	3.95	3.25	7.20	3.62	3.58
1917	4.81	3.17	1.64	6.18	3.01	9.19	5.20	3.99
1918	6.21	3.65	2.56	7.42	3.07	10.49	6.00	4.49
1919	5.15	3.39	1.76	6.37	2.72	9.09	5.65	3.44
1920	[b] 7.94	4.90	3.04	10.15	3.40	13.55	7.73	5.82
1921	5.45	3.82	1.63	5.95	3.46	9.41	7.03	2.38
1922	5.84	4.05	1.79	6.59	3.32	9.91	6.81	3.10

[a] Includes operators' statements of the value of coke consumed by them in associated enterprises but not sold, except that in 1918 and 1920 the value of such coke was estimated by the Geological Survey for each State at the average value for that State of the part of the product reported sold.
[b] Revised from preceding report.

greater than the corresponding deduction for beehive coke.

These comparisons are subject to the comment before made, that where coking operations are subsidiary to the manufacture of pig iron the value placed upon the product may be arbitrary and quite different from the average market price. Where this is true, however, the average cost of coal may be also a nominal figure, because the plants associated with iron furnaces are commonly supplied with coal from mines owned by the same financial interests. The comparison therefore probably indicates in general terms the trend in cost and value from year to year.

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The coal charged in by-product ovens is generally purchased as run of mine. In some districts the coal is washed before coking in order to lower the ash content and remove sulphur. Most of the coal charged in both beehive and by-product ovens in Alabama in 1922 was washed, and all of that in Colorado, Georgia, New Mexico and Washington was washed. Washing is also practised in some districts of Pennsylvania and in Tennessee, but is not applied to the great bulk of by-product coal produced in West Virginia, Virginia, eastern Kentucky and Pennsylvania.

Table 41—Coke Consumed in the Manufacture of Pig Iron, 1913-1922

[From annual report of the American Iron and Steel Institute]

Year	Coke Consumed—Net Tons	Coke Consumed—Pounds Per Gross Ton of Pig Iron Produced	Pig Iron Produced [a] (Gross Tons)
1913.....	37,192,287	2,433.3	30,326,130
1914.....	27,070,856	2,354.4	22,976,856
1915.....	33,224,328	2,252.0	29,535,308
1916.....	44,431,905	2,285.3	38,844,598
1917.....	44,493,316	2,339.7	37,863,643
1918.....	45,703,594	2,375.2	38,422,175
1919.....	35,250,943	2,310.2	30,549,930
1920.....	41,976,171	2,305.6	36,300,024
1921.....	18,162,147	2,200.6	16,579,653
1922.....	29,213,893	2,176.3	26,995,173

[a] Excludes pig iron made with anthracite and charcoal but includes small quantities made with electricity and bituminous coal.

Coke Consumed in Producing Pig Iron

The quantity of coke consumed in the manufacture of pig iron in 1922, according to the American Iron and Steel Institute, was 29,213,000 tons, or 77 per cent of the total production of beehive and by-product coke. Table 41, which shows the consumption of coke in iron manufacture for the last 10 years, brings out a noteworthy improvement in efficiency of fuel utilization. The quantity of coke required to make a gross ton of pig iron declined from an average of 2433.3 pounds in 1913 to 2176.3 pounds in 1922. Among the factors contributing to this gratifying result are increased efficiency in the operation of the blast furnace, replacement of old with new furnaces, and, not least important, improvement in the quality of coke manufactured, an improvement directly correlated with the substitution of by-product for beehive coke.

STEEL EXPORTERS OBJECT

Lower Rail Rates on Shipments in American Vessels Are Not Favored

WASHINGTON, Dec. 23.—Steel exporters generally are opposed to the application at the present time of Section 28 of the Merchant Marine act, which provides for a lower rail rate on shipments exported and imported in American vessels, as against foreign ships, where there is a difference between line haul charges on domestic and export shipments. At least, this is the attitude of steel exporters as set forth in an exhaustive special study to the Department of Commerce by Prof. Stuart Daggett, of the University of California. This report accompanied recommendations of a committee appointed by the President on coordination of rail and steamship activities and recently was submitted to the White House through Secretary of Commerce Hoover. The committee supported the statement in the Presidential message to Congress that action under Section 28 "should be suspended until Congress can reconsider the entire question in the light of the experience that has been developed since its enactment."

Concerning the reported attitude of the iron and steel industry regarding Section 28, it is represented as being based on the fact that steel exporters complain that the section will embarrass them in quoting prices as they will not know in advance in any instance, whether or not they will find space at the seaboard in American vessels. This complaint continues to be the outstanding objection made to the section. From the outset, it has been maintained that there was not an adequate number of American vessels either under the Shipping Board or privately owned at all of the ports to care for requirements of American exporters and importers. Other objections also have been made and are set forth in the report. Among them the question has risen as to whether the so-called free time of 10 days shall be considered part of the rate adjustment in applying to goods imported and exported in American bottoms.

In analyzing the section as it relates to iron and steel, the report of Professor Daggett carries the following table showing exports of iron and steel in 1923, and their distribution between American and foreign bottoms as follows:

Nationality of Vessel	Export	Per Cent
Shipping Board	152,547	11.86
Independent American.....	435,946	33.93
Foreign	696,656	54.21
Total	1,285,149	100.00

The percentages of distribution as set forth in this table are strikingly like those published in THE IRON AGE of Dec. 28, 1922, showing exports of iron and steel products in American and foreign bottoms for 1921. THE IRON AGE tables also showed how imports were distributed between American and foreign ships.

Iron and steel, according to the report, present a typical illustration of the operation of Section 28 upon a commodity which is produced in the interior of the United States and which enjoys export rates through New York as well as through the outports. Professor Daggett offers the comment that the section will hamper the export trade in steel. At the same time, he concedes, that there are apparently no conditions of unusual hardships to be enacted with the application of the law and the steel industry and he points out that the treatment of iron and steel most depends upon the policy generally adopted with regard to flag discrimination and railroad rates. Members of the committee joining in the final recommendations comprise Secretary of Commerce Hoover; Chairman O'Connor of the Shipping Board; Chairman Hall of the Interstate Commerce Commission; President Palmer of the Emergency Fleet Corporation; and President Willard of the Baltimore & Ohio Railroad.

Employers' Association of Eastern Massachusetts Elects Officers

At the annual meeting of the Employers' Association of Eastern Massuchusetts, held Monday evening, Dec. 15, at Young's Hotel, Boston, Charles L. Gilliatt, Norfolk Iron Works, Norfolk Downs, Quincy, Mass., was elected president to succeed A. N. Murray, Murray Printing Co., Cambridge, who automatically becomes a member of the board of managers.

Walter B. Douglass, New England Structural Co., Boston, was reelected second vice-president. The board of managers includes: George P. Aborn, Worthington Pump & Machinery Corporation, Blake & Knowles Works, Cambridge; George M. Gray, Peter Gray & Sons, Inc., Cambridge; and Ralph E. Thompson, Gillette Safety Razor Co., South Boston.

The report of Clarence H. Wilson, manager of the association, was an optimistic one regarding the 1925 outlook for business and labor conditions. Henry H. Crane was the guest of the evening, his subject being, "Business at the Bat," in which he discussed labor conditions in this country. Sixty-five members and guests attended the meeting.

The William Cramp & Sons Ship & Engine Building Co., Philadelphia, has been awarded a $6,565,000 contract by the American-Hawaiian Steamship Co., to build a twin-screw express passenger steamship. The vessel will have a speed of 22 knots and will be driven by geared turbines. She will have a length of 582 ft., a beam of 83 ft. and about 20,000 tons displacement. About 10,000 tons of steel will be required.

Iron and Steel Markets

MORE CONFIDENCE IN 1925

Favorable Developments Mark the Year-End

Railroad Buying and Sheet and Tin Plate Orders Are Features— Pig Iron Higher

As the year draws to a close, steel mills and steel markets continue to give evidence of firmness in prices, and of the improved position of order books and mill schedules. The more confident leaders in the industry now speak with more assurance concerning the first six months of 1925, whereas recently their expressions were limited to the first quarter.

The expectation of a continuance in the early months of 1925, of the rail and car demand of the railroads is one reason for increasing confidence. The sheet industry also has seen a notable revival of demand since early November, and now the tin plate mills are promised a much fuller operation in the next six months than there was reason to look for some weeks ago.

Sheet mills have been actively operated this month, the American Sheet & Tin Plate Co. running at 85 per cent of capacity last week, and the independents at practically the same.

Recent tin plate orders by the large can companies amounted to 6,300,000 boxes for shipment between February and June, and 1925 now has the appearance of an unusual tin plate year, especially in food container sizes, in view of the short pack of 1924.

Output of steel will be at substantially today's rate through the holidays, except for a steel works shut-down on Christmas day. In the Pittsburgh and near-by districts there will be a number of suspensions of rolling mills, though not of steel works, in the two days following.

The Carnegie Steel Co. has started up one blast furnace each at its Edgar Thomson, Farrell, Pa., and Bellaire, Ohio, works. The Pittsburgh Steel Co. has put on its second furnace and the Pittsburgh Crucible Steel Co. will start one next week.

While new buying of finished steel was not large, specifications have come in well through the week, some consumers asking for January shipment of a good part of the material bought for first quarter.

Automobile companies have placed fair orders for sheets and strip steel, some covering only for January and others for February or a full quarter. Parts makers in some cases are increasing operations and ordering steel more freely.

More oil tank work is coming out at Chicago, and 30,000 tons of plates will go into tanks for the new Wortham, Texas, field. Chicago also has the first plate inquiries from shipyards in months—3000 tons for a Lake vessel and 4000 tons for a Pacific liner.

The Southern Pacific's order for 55,000 tons of rails is expected to go to the Colorado and Alabama mills. There is also more than 10,000 tons of track supplies. The Pere Marquette has placed 10,000 tons of rails, the Soo Line 10,000 tons, and the Kansas City Southern 6000 tons. The New York Central has placed 10,000 tons of tie plates.

The Steel Corporation has secured a 6000-ton rail order from the South African Railways at a price indicating that European mills have advanced their quotations several dollars a ton in recent weeks.

Following the reported purchase of 3000 tons of Belgian rails by the Detroit, Toledo & Ironton is the further report that the order is to be or has been increased to several times the original amount.

Prospective increase in cost, owing to the advance in wages of workers in the Connellsville coke region, was the chief factor in advances of pig iron prices ranging from 50c. to $1 per ton. Buying has continued in some centers and for the week included a round tonnage—variously put at 30,000 to 60,000 tons—taken by a radiator company, 25,000 tons of basic by a Kentucky steel company, 40,000 tons of various grades sold in the Cleveland district and about 25,000 tons in the East. Part of the buying was for delivery in the second quarter of next year.

Sellers look on some of the inquiry that is still up for second quarter iron as speculative, and are not hastening to close. There are indications also that speculative buying was a factor in the large sales of November.

The improved position of pig iron sellers is reflected in the statistics of the American Pig Iron Association. Sales in November were 874,000 tons, and shipments, at 348,000 tons, were 27,000 tons more than output. Unfilled orders on Nov. 30 were 1,432,000 tons, against 872,000 tons on Oct. 31. Stocks at merchant furnaces were 867,000 tons at the end of November, compared with 895,000 tons on Oct. 31 and 918,000 tons at the end of September.

In Germany a semi-finished steel syndicate has been formed, which will function from Jan. 1. Syndicates for bars, rails, plates, shapes, etc., are nearing completion.

Pig iron, according to THE IRON AGE composite price, has advanced to $22.09 from $21.67 last week, $2.80 higher than in midsummer.

Finished steel is higher, the composite price advancing from 2.531c. last week to 2.546c. per lb.

Pittsburgh

Mills Will Suspend for a Few Holidays—Pig Iron Prices Marked Up

PITTSBURGH, Dec. 22.—Observance of the Christmas holidays is reflected in somewhat quieter times, as regards both the demand for and the production of steel. There will be a fairly general suspension of rolling mills for the last three days of the week, and while operation of blast furnaces, steel works and coke ovens cannot stop, they will not be forced in view of the lighter demands from the rolling mills.

There has also been slight pause in the buying movement, but this is regarded as a natural development, not only on account of the holidays but the fact

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A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 22, 1924	Dec. 16, 1924	Nov. 25, 1924	Dec. 24, 1923
No. 2X, Philadelphia‡	**$25.01**	$24.51	$23.76	$24.26
No. 2, Valley furnace†	**22.00**	21.00	20.50	22.00
No. 2, Southern, Cin'ti†	24.05	24.05	22.05	25.05
No. 2, Birmingham, Ala.†	20.00	20.00	18.00	21.00
No. 2 foundry, Chicago*	**23.00**	22.50	21.50	23.00
Basic, del'd, eastern Pa.	23.50	23.50	21.50	23.25
Basic, Valley furnace	**21.50**	21.00	20.00	21.00
Valley Bessemer del. P'gh.	**24.26**	23.76	22.26	24.76
Malleable, Chicago*	**23.00**	22.50	21.50	23.00
Malleable, Valley	**22.00**	21.00	20.50	20.00
Gray forge, Pittsburgh	**23.26**	22.26	21.76	23.26
L. S. charcoal, Chicago	29.04	29.04	29.04	29.15
Ferromanganese, furnace	105.00	105.00	105.00	109.00
Rails, Billets, Etc., Per Gross Ton:				
O.h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	36.00	36.00	35.50	40.00
O.-h. billets, Pittsburgh	36.00	36.00	35.50	40.00
O.-h. sheet bars, P'gh	37.00	37.00	37.00	42.50
Forging billets, base, P'gh.	42.50	42.50	40.50	45.00
O.-h. billets, Phila	41.67	41.67	41.67	45.17
Wire rods, Pittsburgh	48.00	48.00	45.00	51.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	1.90	2.35
Light rails at mill	1.80	1.80	1.80	2.25
Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.32	2.32	2.32	2.62
Iron bars, Chicago	2.00	2.00	2.00	2.40
Steel bars, Pittsburgh	2.10	2.10	2.10	2.40
Steel bars, Chicago	2.10	2.10	2.10	2.50
Steel bars, New York	2.44	2.44	2.34	2.74
Tank plates, Pittsburgh	1.90	1.90	1.90	2.50
Tank plates, Chicago	2.20	2.20	2.20	2.60
Tank plates, New York	**2.34**	2.24	2.14	2.74
Beams, Pittsburgh	2.10	2.10	2.10	2.50
Beams, Chicago	2.20	2.20	2.20	2.60
Beams, New York	2.34	2.34	2.24	2.74
Steel hoops, Pittsburgh	2.50	2.50	2.50	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Dec. 22, 1924 Cents	Dec. 16, 1924 Cents	Nov. 25, 1924 Cents	Dec. 24, 1923 Cents
Sheets, black, No. 28, P'gh.	**3.60**	3.50	3.50	3.75
Sheets, black, No. 28, Chicago dist. mill	3.70	3.70	3.60	...
Sheets, galv., No. 28, P'gh.	4.75	4.75	4.60	4.90
Sheets, galv., No. 28, Chicago dist. mill	4.85	4.85	4.70	...
Sheets, blue, 9 & 10, P'gh.	2.70	2.70	2.70	3.00
Sheets, blue, 9 & 10, Chicago dist. mill	2.80	2.80	2.80	...
Wire nails, Pittsburgh	2.85	2.85	2.75	3.00
Wire nails, Chicago dist. mill	2.95	2.95	2.85	...
Plain wire, Pittsburgh	2.60	2.60	2.50	2.75
Plain wire, Chicago dist. mill	2.70	2.70	2.60	...
Barbed wire, galv., P'gh.	3.65	3.65	3.45	3.80
Barbed wire, galv., Chicago dist. mill	3.65	3.65	3.55	...
Tin plate, 100 lb. box, P'gh.	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$21.50**	$20.00	$19.00	$20.50
Carwheels, Philadelphia	**19.50**	19.00	19.00	19.50
Heavy steel scrap, P'gh.	**22.00**	21.50	20.00	19.00
Heavy steel scrap, Phila.	**21.00**	20.00	19.00	17.50
Heavy steel scrap, Ch'go.	**19.25**	18.75	17.50	17.25
No. 1 cast, Pittsburgh	**19.50**	19.00	18.50	21.50
No. 1 cast, Philadelphia	**20.00**	19.50	18.50	21.00
No. 1 cast, C'go (net ton)	**19.50**	19.00	18.00	20.00
No. 1. RR. wrot. Phila.	21.00	21.00	19.00	19.00
No. 1 RR. wrot. Ch'go (net)	**17.00**	16.50	16.00	16.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.15	$4.00
Foundry coke prompt	4.50	4.50	4.25	4.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**14.87½**	14.50	14.00	13.25
Electrolytic copper, refinery	**14.50**	14.25	13.75	12.87½
Zinc, St. Louis	**7.57½**	7.55	6.85	6.25
Zinc, New York	**7.92½**	7.90	7.20	6.60
Lead, St. Louis	**9.62½**	9.37½	8.60	7.75
Lead, New York	**10.00**	9.62½	9.00	8.00
Tin (Straits), New York	**57.25**	56.87½	54.25	47.30
Antimony (Asiatic), N. Y.	14.00	14.00	14.50	10.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market report on other pages.

THE IRON AGE Composite Prices

Dec. 22, 1924, Finished Steel, 2.546c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

Dec. 16, 1924,	2.531c.
Nov. 25, 1924,	2.517c.
Dec. 24, 1923,	2.775c.
10-year pre-war average,	1.689c.

Dec. 22, 1924, Pig Iron, $22.09 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

Dec. 16, 1924,	$21.67
Nov. 25, 1924,	20.54
Dec. 24, 1923,	21.88
10-year pre-war average,	15.72

1924 to Date High	1924 to Date Low		1923 High	1923 Low
2.789c., Jan. 15	2.460c., Oct. 14	Finished Steel	2.824c., April 24	2.446c., Jan. 2
$22.88, Feb. 26	$19.21, Nov. 3	Pig Iron	$30.86, March 20	$20.77, Nov. 20

that buyers already have ordered and specified against much of their early 1925 requirements.

The week has brought out no important price changes in steel, but the undertone of the market is very strong and an increasing number of producers now feel that they have all the business they want at prevailing prices. Two or three mills have announced that they are not interested in more business in sheet bars at less than $40, and some of them are disposed to ask a corresponding advance over recent prices of billets and slabs. Prices of less than 2c. base, Pittsburgh, on plates now are interesting to only one or two producers and some makers have withdrawn from the market. One Youngstown district maker of hot-rolled flats has announced a base of 2.50c. for all material wider than 1 in. Other makers, however, are slow to follow this change.

Recent restoration of wages by independent Connellsville coal and coke producers continues to find reflection in the pig iron market, which is $1 a ton higher than a week ago on foundry malleable grades and 50c. higher on the steel making grades. The full increase in the cost of producing coke automatically is passed along to pig iron producers on all contract shipments after Dec. 31. Besides the higher coke cost, pig iron producers are disposed to hold firmly because of the possibility of higher ore prices for the coming year. An advance of 50c. a ton is mentioned, which roughly would mean $1 a ton increase in pig iron producing costs.

The Carnegie Steel Co. has blown in blast furnaces at its Edgar Thomson, Farrell, Pa., and Bellaire, Ohio, works since a week ago, and now has 41 out of 58 stacks in production. The Pittsburgh Steel Co. has put on its second blast furnace and the second furnace of the Pittsburgh Crucible Steel Co. will be lighted next week.

Pig Iron.—Prices still are moving upward in this market, not so much because of a good demand as because of the higher producing costs brought about by the recent wage increase by independent Connellsville district coal and coke producers which must be borne by the merchant pig iron producers who are bound by a wage scale clause in the first quarter coke contracts. Pig iron producers take the position that they should get more money for their iron because of the higher costs and are refusing to entertain at recent prices. An Alliance, Ohio, melter was able to buy 5000 tons of basic iron within the past week at $21.50, Valley furnace, an advance of 50c. a ton over the price of a week ago. Even higher prices now are asked by all makers, but no sales are noted at the advanced levels. As much as $23 is asked for Bessemer iron at Valley furnaces, but the only sales that have been made have been at $22.50. Sales of foundry iron have been all of small lots for early delivery and have been at from $22 to $23 but there are only one or two makers who now take business at the lower figure. A few inquiries have been made for second quarter tonnages of foundry iron, but producers seem unwilling just now to name prices for that period because of doubt as to where coke prices will be at that time and the strong possibility that ore prices will be advanced. It is said that there is a profit in iron ore at present prices for only a few producers and in view of the recent advance in pig iron prices, an effort will be made to put ore on a more remunerative basis. It is not believed that there will be many further additions to the list of active merchant furnaces in the next few months, as most of the furnaces now idle are without ore stocks and Lake dock stocks available for market are said to be very scant.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.50 to $22.00
Bessemer	22.50 to 23.00
Gray forge	21.50 to 22.50
No. 2 foundry	22.00 to 23.00
No. 3 foundry	21.50 to 22.50
Malleable	22.00 to 23.00
Low phosphorus, copper free	29.00

Ferroalloys.—A further advance of $5 a ton has been announced in ferro-manganese. British producers, following their instructions to agents to close on all business that has been quoted against and then withdraw the price of $105, c.i.f. Atlantic seaboard, duty paid, announced a price of $110, effective Dec. 20. Domestic producers, who lately have had a price of $105 furnace for first quarter tonnages and $110 for second quarter shipments, now are quoting the higher price for both periods. A fair amount of both domestic and British material has been booked at $105, but no large sales are noted on this advance, as so many local consumers had covered against their first quarter requirements previously. The market also is looking up on spiegeleisen, not that producers are so heavily committed, but because of increasing costs in the shape of higher coke prices and the fact that there is not much profit in the business already booked. Only a few of the consumers of 50 per cent ferrosilicon have failed to contract for at least a portion of their 1925 requirements and, unlike a year ago, the quoted price has been obtained in practically all cases. Ferrotungsten is stronger here and some sellers now are naming as high as 95c. per lb., contained. Tungsten ore is said to be scarce and the price is rising. Prices are given on page 1707.

Semi-Finished Steel.—The rush of finished steel orders has put most producers of semi-finished steel for market in an independent position and some recent inquiries have brought out sharply higher quotations. At least one of the Youngstown companies is naming $40 as the lowest price at which it is willing to consider additional sheet bar business and a Pittsburgh producer has the same idea as to sheet bars and small billets. Quotations of $37.50 and even $38 are heard on large billets and on slabs. These prices, representing, as they do, an advance of about $5 a ton over the basis at which considerable business was done just prior to the election, have not yet found much basis in sales, consumers being inclined to resist them on the score that their orders for first quarter business are very largely at lower than present prices. At the moment, the higher prices constitute a notice to consumers that producers naming them are not anxious for additional business. Wire rods are not yet selling often or in large lots at the present base of $48, Pittsburgh. Steel works operations in this and nearby districts still are expanding, with the two larger independent companies now at or near full capacity, and the general average of ingot production fully 85 per cent of capacity. Prices are given on page 1707.

Iron and Steel Bars.—Steel bars appear to be shaping for a further advance in prices. Secondary manufacturers, notably the makers of cold-finished bars, have heavy contracts for first quarter, and it is said that specifications for even 75 per cent of the contracts will tax productive capacity. Hot-rolled bar specifications naturally are heavy and makers are so well committed for the next two months that they are not anxious for more business. The need of supplies, however, is not yet pressing and with mill shipments still reasonably prompt there is as yet no offering of delivery premiums. Good demand is noted for refined iron bars at well sustained prices. Prices are given on page 1706.

Wire Products.—Liberal specifications have come to manufacturers on orders for goods for shipment in January, and productive capacity, which has been on an increasing scale for the past month, will further increase this week. There are suggestions of another advance in prices, but this will depend on how promptly the consumptive requirements expand; there is little question that jobbers and manufacturing consumers have contracted more heavily than they would have if the price tendency had been downward. The first quarter of the year is not ordinarily a period of big consumption, and the present movement being for building up stocks, a quiet period would seem likely until consumption gains. Except for the freight concessions which makers have to grant to hold distant customers, the price situation is steady. Wire mills in this district are about 80 per cent engaged. Prices are given on page 1706.

Rails and Track Supplies.—Makers of light steel rails have stronger price ideas owing to the advancing cost of their raw material and in billet rails there is a disposition to seek more money on the ground that present prices are unprofitable. The demand, however, is not strong enough to support an advance. Large orders for standard rails have not been accompanied by large orders for spikes and tie plates and strength of prices in that direction is largely because of the strength of the raw materials. Spike makers in this district could handle more business than they are getting. Prices are given on page 1706.

Tubular Goods.—The possibility of the disappearance of the price concessions that have been available on line pipe, in keeping with the general strength of the steel market, has promoted a lively interest in that kind of pipe and makers now are quoting against a larger volume of such business than before in almost a year. The Hope Natural Gas Co. has placed about 100 miles of plain end 20-in. pipe for an extension to its present gas line in West Virginia. Only three makers are equipped to make pipe of that size. Continued good demand is noted for merchant pipe in the buttweld sizes, but lapwelded pipe still is relatively slow, waiting on definite betterment in the oil situation. Improvement in the demand for boiler tubes has not yet been reflected to any considerable extent in prices. Discounts are given on page 1706.

Cold-Finished Steel Bars and Shafting.—So far as first quarter contracts are concerned, local makers have nothing to complain of in point of volume, and specifi-

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cations for January shipment are being made with a fair degree of freedom. Facing higher prices, consumers probably have contracted for more rather than less than they are likely to order out, but, allowing for that fact, makers believe they will have an outlet for all they can produce. The present base of 2.80c. Pittsburgh district mills, does not yet embrace much tonnage, since 2.70c. was the base on first quarter contracts. Ground shafting is 3.20c., base f.o.b. mill, for lots of a carload or more.

Bolts, Nuts and Rivets.—A very fair volume of first quarter business is reported by local makers of bolts and nuts under the revived delivered price method of selling. It is said that the change has produced no localization of business, but rather has enlarged the field for buyers, who now get the same delivered price regardless of the point of origin. Rivet prices for first quarter are the same as those for the present quarter, but remain f.o.b. Pittsburgh, Cleveland or Chicago. Prices and discounts are given on page 1707.

Structural Material.—Mills in this district have all the business they want at lower prices, and are very firm at 2.10c., base, for large beams on new business. Fabricated steel business in this immediate district still is light, although there will be an award, probably this week, of the 18,000 tons of steel for three Pittsburgh bridges. Much of this tonnage, however, is for rather distant delivery. Fabricating shops in this district are not very heavily booked. Plain material prices are given on page 1706.

Plates.—The market here is gradually gaining in strength because competition for orders is lessened by the fact that a number of makers have all the business they want at the lower levels. The price range is the same as a week ago, but the lower figure now refers to large lots rather than the general run of sales. Prices are given on page 1706.

Sheets.—It is still possible to secure black sheets for early delivery at 3.50c. base, Pittsburgh district mills, but only a small percentage of total capacity is represented in the mills willing to take business at that price. In a general way the market is firm at the bases of the American Sheet & Tin Plate Co. because the majority of mills are comfortably filled at lower levels and those which do not make their own sheet bars are confronted with the possibility of higher prices. The American Sheet & Tin Plate Co. last week had an operation of approximately 85 per cent of capacity and the independents were on practically the same rate. This week's operations will be lower because of the observance of the Christmas holiday. Prices are given on page 1706.

Tin Plate.—As a result of recent large orders by the large can companies, which amount to 6,300,000 base boxes for shipment between February and June, the leading producer is very largely obligated against its first half production. Independent companies likewise have become pretty well obligated against probable production for the same period. It looks like a big year in tin plate, especially in the food container sizes, because the short pack this year is expected to mean a very close clearance before the new packing season opens. With the American Sheet & Tin Plate Co. sold up for the first half of the year at its Western plants, the price of tin plate in Chicago is beginning to show a stronger tendency.

Hot-Rolled Flats.—Makers are becoming well obligated against first quarter production and there is a tendency on the part of some mills to seek higher prices. One Youngstown district mill already has announced 2.50c. base on all materials wider than 1 in. Prices are given on page 1706.

Cold-Rolled Strips.—Makers generally are better off in the matter of order books than they were a short time ago and 4.15c. base, Pittsburgh district mills, is becoming a more common quotation. At the same time, 4c. has not entirely disappeared and tonnages that are attractive from a mill standpoint still can be placed at that figure.

Coal and Coke.—The effort to translate the recent wage advance into higher prices for spot coke has not been especially successful. While sales are reported as high as $4.50 per net ton at ovens for spot furnace coke, this appears to be exceptional, as producers without contracts for the present quarter and hence without regular consuming connections have found it very difficult to make sales at above $4 and have even gone as low as $3.75, where the market was at the time of the wage change, to effect sales. The market is quotable from $3.75 to $4.50 with $4 the common maximum price. Spot foundry coke remains at $4.50 to $5. The recent advance in coking coal brought about by the change in the wage scale, is maintained, but the market still is dull and weak on steam coal. It is reported that notices have been posted at a number of union mines in the district suggesting that idle miners can find work at the union scale at the plants of the H. C. Frick Coke Co. With the Connellsville district operators now paying union scale, a good many idle miners in union fields would naturally be attracted to Connellsville.

Old Material.—The upward tendency of prices continues. Heavy melting steel sales in the past week to consumers have been at $22 to $22.50 and at least two local steel companies have been buying. Heavy steel scrap cannot come past eastern Pennsylvania with mills in that district paying a relatively higher price than can be obtained here, while shipment from the West past Youngstown is made difficult by the fact that there have been sales in that district of that grade at above $22 and of compressed sheets at above $20. Dealers still are very bullish, because they believe that the steel companies must buy before long, and it is reported that one is offering $23 for heavy steel scrap for delivery at a point where $22 recently was paid for a tonnage running into five figures. Much firmness is noted in the steel foundry grades. Rerolling rails are fetching higher prices than could be obtained recently, under a more active demand. The principal local user of cast iron borings is out of the market and current offerings are not salable at recent prices.

We quote for delivery to consumer's mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$22.00 to $22.50
No. 1 cast, cupola size	19.50 to 20.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	22.00 to 23.00
Compressed sheet steel	20.00 to 20.50
Bundled sheets, sides and ends	19.00 to 19.50
Railroad knuckles and couplers	23.00 to 23.50
Railroad coil and leaf springs	23.00 to 23.50
Low phosphorus blooms and billet ends	26.00 to 26.50
Low phosphorus plate and other material	24.50 to 25.00
Railroad malleable	21.00 to 21.50
Steel car axles	23.00 to 23.50
Cast iron wheels	20.00 to 20.50
Rolled steel wheels	23.00 to 23.50
Machine shop turnings	17.50 to 18.00
Sheet bar crops	24.00 to 25.00
Heavy steel axle turnings	18.50 to 19.00
Short mixed borings and turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	17.00 to 17.50
Cast iron borings	16.50 to 17.00
No. 1 railroad wrought	19.00 to 19.50
No. 2 railroad wrought	22.00 to 22.50

Old Material Strong at Detroit

DETROIT, Dec. 22.—**The tone of the market on old material is very strong. While scrap production has fallen off somewhat due to inventory period, shipments are about normal and dealers' stocks are not unusually heavy. Melters expect heavy production through the first quarter and their pig iron and other iron and steel purchases do not show any speculation. Prices are the same as quoted a week ago.**

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$17.00 to $17.50
Shoveling steel	16.50 to 17.00
Borings	14.00 to 14.50
Short turnings	14.00 to 14.50
Long turnings	13.50 to 14.00
No. 1 machinery cast	18.00 to 18.50
Automobile cast	18.50 to 19.50
Hydraulic compressed	15.50 to 16.00
Stove plate	15.00 to 16.00
No. 1 busheling	14.50 to 15.00
Sheet clippings	11.00 to 12.00
Flashings	13.50 to 13.50

Chicago

Demand Active for All Kinds of Steel—Pig Iron Again Marked Up

CHICAGO, Dec. 22.—Pig iron has advanced another half dollar after a week of continued activity. Demand for finished steel also shows little recession with the approach of the holidays. In fact, both the sales and specifications of leading mills rolling heavy products were above the average for the past month. Considerable rail tonnage has been placed and orders from car-builders are heavy. Oil tank fabricators are also liberal buyers, having booked numerous tanks for the new Wortham, Tex., field, as well as for the Pacific Coast producing section.

The most impressive feature of the market is the universal character of demand for steel. Buying of pig iron is no less widespread, but with melters now entering the market for second quarter, the question arises whether they are not making speculative purchases. The local production situation remains unchanged, with mill operations ranging from 85 to 90 per cent. No steel works blast furnaces have gone in during the week, but an additional South Chicago stack is scheduled for blowing in within a few days.

The customary holiday shut-down of furnaces and mills will be limited this year to a 24-hr. lay off on Christmas Day.

Pig Iron.—In another active week local iron has advanced 50c. to $23, base furnace. The American Radiator Co. has closed for 30,000 tons for the second quarter requirements of its Western plants. A Chicago buyer has bought 3000 tons of basic for delivery to plants east of here. New inquiries in many instances are for second quarter or the entire first half. Inquiries for second quarter include the following: One thousand tons of foundry, 900 tons of foundry, 500 tons of foundry for Illinois melters and 1000 tons of malleable and 500 tons of foundry for Wisconsin users. Sellers are inclined to the view that a considerable portion of the tonnage on inquiry for second quarter is speculative and in view of the uncertainties facing producers are not pressing sales. Prospects of higher fuel costs recently brought to a focus by the Connellsville situation now assume the guise of even greater certainty in view of the impending anthracite strike, a development which would stimulate sales of both domestic coke and bituminous coal. Local producers are undergoing increasing pressure for shipments of iron, a fact which brings out in bold relief how much more rapidly castings output can be increased as contrasted with pig iron production. December deliveries from merchant furnaces in this area will undoubtedly prove to be the heaviest of the year. A number of Southern furnaces have advanced to $20.50 and to $21, base Birmingham, but the $20 quotation has not entirely disappeared. Fully 2000 tons of barge and rail iron has been sold during the week, largely for second quarter shipment. A Wisconsin melter is inquiring for 500 tons of Southern foundry. Charcoal and silvery prices are unchanged. Electric ferrosilicon, 14 to 16 per cent, is irregular, the last sale having been on the basis of $44, delivered.

Quotations on Northern foundry, high phosphorus, malleable and basic iron are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards.

Northern No. 2 foundry, sil. 1.75 to 2.25	$23.00
Northern No. 1 foundry, sil. 2.25 to 2.75	24.00
Malleable, not over 2.25 sil.	23.00
Basic	23.00
High phosphorus	23.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (barge and rail)	24.18
Southern No. 2, sil. 1.75 to 2.25	$26.01 to 27.01
Low phos., sil. 1 to 2 per cent, copper free.	33.00
Silvery, sil. 8 per cent	$5.29
Electric ferrosilicon, 14 to 16 per cent	44.00

Ferroalloys.—Ferromanganese has advanced generally to $110 seaboard. Sales of spiegeleisen have been made at an advance of $1, namely, at $33, eastern furnace.

We quote 80 per cent ferromanganese, $117.56, delivered; 50 per cent ferrosilicon, for 1925 delivery, $82.50, delivered; spiegeleisen, 18 to 22 per cent, $41.58, delivered.

Billets.—A local mill has booked an order for 10,000 tons of billets. Both billets and sheet bars are said to have advanced to a minimum of $38, Chicago.

Plates.—The recent opening of the new Wortham, Tex., oil field has resulted in the placing of 222 tanks calling for fully 30,000 tons of plates. A local mill has booked 5000 tons for oil tanks within the past week. For the first time in months steel producers are receiving inquiries for ship steel. The Manitowoc Shipbuilding Co., Manitowoc, Wis., is figuring on a Lake vessel requiring 3000 tons, and the Matson Navigation Co. on the Pacific Coast is making estimates on an ocean liner calling for 4000 tons. Chicago mills continue to receive heavy specifications from car builders.

The mill quotation is 2.20c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Sheets.—Rumors of recent concessions in sheets appear to be without foundation; in fact, there is again talk of early advances not only in blue annealed but also in galvanized. It is pointed out that the sharp advances in spelter make a readjustment of galvanized quotations necessary.

Chicago delivered prices from mill are 3.75c. for No. 28 black, 2.85c. for No. 10 blue annealed, 4.90c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.80c. base for blue annealed, 4.50c. base for black, and 5.50c. base for galvanized.

Bars.—In soft steel bars, both specifications and new business are heavy for this season and an independent mill is now practically committed through first quarter. Bar iron demand is steadily improving and one important mill, now booked four weeks ahead on a single turn basis, is seriously considering going on double turn. Bar iron is unchanged at 2c., Chicago, however, and it is probable that this price will remain in effect until January. Rail steel bar mills continue to accumulate heavier commitments, although they have not yet advanced their prices.

Mill prices are: Mild steel bars, 2.10c.; common bar iron, 2c. to 2.10c., Chicago; rail steel, 2c. to 2.10c., Chicago mill.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.80c. for rounds and 4.30c. for flats, squares and hexagons; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.60c.

Wire Products.—Specifications are falling off as inventory taking approaches, but in the meantime mills have built up their operations to a 75 to 80 per cent rate and have drawn so heavily on stocks that they are already short of some special items. Most buyers have covered their needs well into the first quarter and are expected to specify heavily after Jan. 1. For mill prices, which are unchanged, see page 1706.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed, $3.15 per 100 lb.; common wire nails, $3.25 per 100 lb.; cement coated nails, $2.55 per lb.

Rails and Track Supplies.—The Soo Line has divided 10,000 tons of rails together with fastenings between the Illinois, Inland and Bethlehem mills. The Pere Marquette has also closed for 10,000 tons of rails, dividing the tonnage between Illinois, Inland and Bethlehem. The Kansas City Southern has brought 6000 tons of rails, of which 3000 tons was placed with the Bethlehem mill, 2000 tons with the Colorado company and 1000 tons with the Inland Steel Co. The Detroit, Toledo & Ironton, which recently bought 3000 tons of rails from Belgium at a reported delivered price which was lower than any available from American sources, is said to have increased the order to 30,000 tons. A local

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purchaser has booked a total of 11,000 kegs of spikes and bolts and 2600 tons of tie plates during the week.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 1.90c. to 2c., f.o.b. maker's mill.

Standard railroad spikes, 2.90c. mill; track bolts with square nuts, 3.90c. mill; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.45c. base, and track bolts, 4.45c. base.

Cast Iron Pipe.—The mid-winter season of heavy buying by the larger municipalities is close at hand and already important purchases have been made. Madison, Wis., awarded 2580 tons of 30-in. Class A to United States Cast Iron Pipe & Foundry Co. at $52.35. Lynchburg Foundry Co. bid $52.75 and Warren Foundry & Pipe Co., $53.70. Youngstown and Hamilton County, Ohio, have each awarded 1100 tons to the United States Cast Iron Pipe & Foundry Co. The American Cast Iron Pipe Co. was the sole bidder on 1800 tons for Minneapolis and presumably will be awarded the tonnage. Detroit will take bids Dec. 29 on 2000 tons of 6-in., 2000 tons of 8-in. and 1250 tons of 12 in. La-Grange Park and Villa Park, Ill., are expected to close this week on 700 tons each, and Wheaton, Ill., is also about to buy a round tonnage.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $52.20; 6-in. and over, $48.20; Class A and gas pipe, $4 extra.

Structural Material.—Fabricating awards are light, but considerable new work is in the prospective stage, notably the Textile Exchange, Chicago, 9000 tons, and a few large projects are approaching the figuring point, among them the Stevens Hotel, Chicago, 17,000 tons, on which bids will be taken in January. Fabricators are comfortably booked and mill prices on plain material are firm.

The mill quotation on plain material is 2.20c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Bolts, Nuts and Rivets.—Heavy specifications against fourth quarter contracts, liberal contracting for first quarter and fresh orders at the new prices are reported by bolt and nut makers. Rivet makers have also opened their books for first quarter. On small rivets they are quoting 70 off and, like the bolt and nut manufacturers, are allowing freight east of the Mississippi River and north of the Ohio River as far as a line drawn from Dubuque, Iowa, to Milwaukee, Wis. On large rivets the ruling quotation remains unchanged at $2.75, f.o.b. Chicago. For complete list of mill quotations see page 1707.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.70c.; machine bolts up to ⅞ x 4 in., 55 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 4 in., 50 off; larger sizes, 50 off; hot pressed nuts, squared, tapped or blank, $3.50 off; hot pressed nuts, hexagon, tapped or blank, $4 off; coach or lag screws, 60 per cent off.

Reinforcing Bars.—With the holidays close at hand, interest in concrete bars is flagging and lettings above 100 tons are few. The arrival of severe weather has also tended to cause the postponement of contemplated projects. The leading award of the week was 450 tons for the Ward bakery, Detroit, which went to the McRae Steel Co. Prices remain unchanged at 2.60c., Chicago warehouse.

Pending work includes:

Addition to American Furniture Mart building, Chicago, 2000 tons, general contract awarded to Wells Brothers Construction Co.

Theater building, Devon Avenue and Sheridan Road, Chicago, 200 tons, Levy & Klein, architects.

St. Luke's Hospital, Cedar Rapids, Iowa, 100 tons.

Harding public school, Des Moines, Iowa, 200 tons.

Victor Adding Machine Co. plant addition, Chicago, 100 tons, steel expected to be placed immediately.

Alloy Steel Bars.—Demand is steadily improving, the gain in business from the automobile industry being particularly encouraging, but prices are unchanged. Chicago quotations are $2 a ton above the prices at Pittsburgh, shown on page 1707.

Old Material.—Heavy purchases of scrap during the past month have largely exhausted visible supplies, producing a condition of scarcity which has not been helped by the severe weather nor by the propensity of holders of material to delay selling pending further price advances. In their effort to fill recent orders from consumers dealers have been forced to pay 25c. to 75c. a ton more than the prices at which they sold the material. In fact, there are a number of decidedly "short" interests in the market. The present situation may properly be described as a dealers' market, reflecting the prices which they must pay—and are paying—to discharge their obligations. The tensity of the market may be relieved shortly when the Inland Steel Co. blows in its third blast furnace, which has been rebuilt. The additional supply of hot metal, of course, will make that mill less dependent on scrap. On the other hand, with pig iron advancing rapidly it may still prove more advantageous to sell the iron and buy scrap—even at higher prices than now obtained. Railroad offerings are light.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$20.00 to $20.50
Cast iron car wheels	21.50 to 22.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	27.00 to 32.00
Forged steel car wheels	23.00 to 23.50
Railroad tires, charging box size	23.50 to 24.00
Railroad leaf springs, cut apart	23.00 to 23.50
Rails for rolling	21.00 to 21.50
Steel rails, less than 3 ft.	21.00 to 21.50
Heavy melting steel	19.25 to 19.75
Frogs, switches and guards cut apart	19.50 to 20.00
Shoveling steel	19.00 to 19.50
Drop forge flashings	15.00 to 15.50
Hydraulic compressed sheets	16.50 to 17.00
Axle turnings	17.00 to 17.50
Steel angle bars	20.00 to 20.50
Steel knuckles and couplers	23.00 to 23.50
Coil springs	24.00 to 24.50
Low phos. punchings	20.50 to 21.00
Machine shop turnings	12.50 to 13.00
Cast borings	14.75 to 15.25
Short shoveling turnings	14.75 to 15.25
Railroad malleable	20.50 to 21.00
Agricultural malleable	20.00 to 20.50

Per Net Ton

Iron angle and splice bars	$21.00 to $21.50
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	27.50 to 28.00
Steel car axles	21.50 to 22.00
No. 1 busheling	15.25 to 15.75
No. 2 busheling	11.75 to 12.25
Pipes and flues	14.00 to 14.50
No. 1 railroad wrought	17.00 to 17.50
No. 2 railroad wrought	17.25 to 17.75
No. 1 machinery cast	19.50 to 20.00
No. 1 railroad cast	18.00 to 18.50
No. 1 agricultural cast	18.00 to 18.50
Locomotive tires, smooth	18.75 to 19.25
Stove plate	16.00 to 16.50
Grate bars	16.00 to 16.50
Brake shoes	16.00 to 16.50

M. Barde & Sons Steel & Machinery Co., successor to the Barde Steel & Machinery Co., jobber in steel, machine tools, mill, mine and power plant equipment, has consolidated branches in Portland, Ore., Seattle, Wash., and San Francisco, which formerly operated as separate units. Plans are under way for the construction of an addition to the Seattle warehouse, which will be equipped for jobbing purposes. L. B. Barde is vice-president. The main office is at 2715 First Avenue South, Seattle.

Horse-drawn vehicles were produced in 1923 to the number of 236,091, valued at $22,493,408, compared with 107,279 in 1921, with a value of $12,175,206. The number of establishments decreased 49 per cent, from 967 in 1921 to 493 in 1923. The number of wage earners decreased also, from 10,544 to 9723. The total value of products from these establishments showed a slight decrease, from $42,445,968 to $41,994,193. The horsepower used in 1923 was 35,701 and the coal consumed 109,481 net tons.

E. J. Lowry, metallurgist, Hickman, Williams & Co., will address the Quad City Foundrymen's Club at Leclaire Hotel, Moline, Ill., Jan. 15. His lecture will be illustrated by slides and will embrace a discussion of carbon in pig iron in relation to castings practice, sulphur and desulphurization, and methods of controlling elements in the cupola.

New York

Specifications on Steel Contracts Call for Large Volume—French Steel Offered

NEW YORK, Dec. 22.—Specifications against contracts continue in astonishing volume; bookings with a number of selling offices are considerably better so far in December than for the same period of November; speculation in buying is generally regarded as absent and the activity has hit all lines save perhaps cold finished steel. Indications are that the activity will continue through December almost without regard for the holidays. Deliveries are getting more extended and one large independent is pretty well booked for all the first quarter. Current purchases are, of course, accompanied with the request to ship after Jan. 1. Fresh inquiries have come from jobbers, who report fairly free selling from their stocks. One noteworthy inquiry appeared in plates, covering 5000 tons for the Standard Oil Co. for the first quarter. A sale of 1500 tons of plates for next year is noted, with the claim that the price governing is somewhat below the ruling market. Plates appear to be a minimum at 2c., Pittsburgh, and have been bought in carload lots at this price following a short period in which 1.90c. was obtained. The fact remains that many of the large buyers, having plates in mind, are facing a new scale of prices $10 a ton above the basis of current shipments. Renewed offers of French steel have been made, including beams at $31.50, c.i.f., per gross ton, billets $28.50, channels $32, bars and angles of bar size $33, concrete bars $32.50, made from billet steel; deformed bars $35, also from billet steel, and wire rods $37. This would mean duty paid 1.60c. per lb. for beams.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.44c.; plates, 2.34c. to 2.44c.; structural shapes, 2.34c. to 2.44c.; bar iron, 2.34c.

Pig Iron.—Following the announcement of the advance in wages of coal and coke workers in the Connellsville district by leading independents, the pig iron market has advanced to a basis of $23, Buffalo, for No. 2 plain and $22.50, eastern Pennsylvania, while some Virginia iron has been sold at $25, furnace. These prices represent an advance of $1 on Virginia and Buffalo iron and 50c. on eastern Pennsylvania. Sales of the past week amount to about 25,000 tons, about equally divided between first quarter and second quarter of next year. The American Locomotive Co. bought 2000 tons and is inquiring for 500 tons. The New York Central bought 850 tons. Pending inquiries include 4000 tons for the Bayonne plant of the American Radiator Co. for second quarter. Other inquiries are for 3000 tons for a New Jersey melter and 1000 tons for a Connecticut company. Foreign irons are still being offered, but few sales are reported, and domestic producers do not greatly fear the competition from abroad.

We quote delivered in the New York district as follows having added to furnace price $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 2, sil. 1.75 to 2.25	$26.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	27.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	26.52
Buffalo, sil. 1.75 to 2.25	27.91
No. 2 Virginia, sil. 1.75 to 2.25	30.44 to 31.44

Warehouse Business.—In some quarters activity has received an impetus, presumably from overflow business of the mills which find it increasingly difficult to meet delivery demands. Orders, though no more numerous, are larger, while prices hold firm in some lines and in others have advanced. Reinforcing bars, structurals and blue annealed sheets were the best movers, the unusual activity in structurals being attributed to closed rollings at some of the mills. An advance in the price of blue annealed is expected next week. Machine bolts in all sizes have advanced to 45 and 10 per cent off list. Hot pressed nuts, rivets and washers also were advanced. In the case of bolts not all houses have adopted the new schedule. Prices are given on page 1722.

Ferroalloys.—British producers of ferromanganese late last week advanced their price $5 per ton to $110, seaboard, and the entire market is now on that basis. Previous to this heavy sales, totaling 10,000 to 15,000 tons, were made on the basis of previous negotiations at $105. While there are not many inquiries before the market, it is believed that consumers have considerable yet to buy because of the rapid expansion of steel output. Liberal sales of spiegeleisen have been made and the price has been advanced $1 per ton to a range of $33 to $35, furnace, depending on the quantity and delivery. The lower grade has been correspondingly advanced to $32 to $34.

Cast Iron Pipe.—Shops report that they are busy, but, with foreign companies showing much activity, there is uncertainty as to maintenance of prices.

We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.60 to $55.60; 4-in. and 5-in., $59.60 to $60.60; 3-in., $69.60 to $70.60, with $5 additional for Class A and gas pipe. Demand for soil pipe continues active and discounts have been advanced 2½ points. Discounts of both Northern and Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 40½ to 41¼ per cent off list; heavy, 50 to 51¼ per cent off list.

Old Material.—Prices on all grades continue strong and in most cases have advanced in the past week. Brokers are paying from $19 to $20 delivered to eastern Pennsylvania consumers for No. 1 heavy melting steel and the trend is still upward. While consumers in most instances are continuing to accept deliveries through the holiday and inventory period, mills at Pottsville and Harrisburg are reported to have curtailed shipments of heavy melting steel until Jan. 1. As high as $18 per ton, delivered eastern Pennsylvania, is being paid for forge fire. Machine shop turnings are quoted at $16 to $16.50 per ton delivered. Borings and turnings are unchanged at $13 and $14.50 per ton, delivered. Brokers are offering $14.75 per ton, delivered to a New Jersey consumer, on stove plate, the freight rate being $2.02 per ton. For delivery to other consumers paying a higher price, as high as $13.25 per ton, New York, is being offered for stove plate by brokers. No. 1 heavy breakable cast shows a further advance of 50c per ton, brokers now offering up to $14.75 per ton, New York. One eastern Pennsylvania consumer is reported to have closed on about 5000 tons of heavy melting steel this week at $21, but generally the market is quiet as far as new buying is concerned.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$14.00 to $14.50
Heavy melting steel, railroad or equivalent	15.50 to 16.50
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	24.00 to 25.00
Steel car axles	21.00 to 22.00
Iron car axles	27.00 to 28.00
No. 1 railroad wrought	15.50 to 16.00
Forge Fire	13.00 to 14.00
No. 1 yard wrought, long	15.00 to 16.00
Cast borings (steel mill)	11.50 to 12.00
Cast borings (chemical)	17.00 to 18.00
Machine shop turnings	12.50 to 13.00
Mixed borings and turnings	10.50 to 11.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	13.75 to 14.25
Stove plate	12.75 to 13.25
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	16.00 to 16.50
Cast iron car wheels	16.00 to 17.00
No. 1 heavy breakable cast	14.25 to 14.75

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$17.00 to $17.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

Frederick B. Patterson, president of the National Cash Register Co., Dayton, Ohio, announces $204,808 has just been paid to the rank and file of the factory and office employees as their share of the estimated percentage of the profits of the company for the last half of the year. This is the second large payment made to this group of employees this year, and there will be a final payment in February after inventory. The sum indicated above does not include the shares in the profits due to department heads and others. These will be distributed later.

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Cincinnati

Steel Company Buys Round Tonnage of Basic Pig Iron

CINCINNATI, Dec. 22.—The Andrews Steel Co. has closed for approximately 25,000 tons of basic pig iron for first quarter delivery, the order presumably going to a Valley producer at an undisclosed price. The American Radiator Co. purchased 3500 tons of foundry iron for second quarter from a southern Ohio furnace. Another purchase was of 1000 tons of foundry for first quarter by a nearby melter. The Louisville & Nashville Railroad bought 500 tons of Southern and the Norfolk & Western Railroad 300 tons of Virginia iron. Other sales called for carload lots up to 200 tons. Prices are very strong, and southern Ohio furnaces have advanced 50c. to a minimum of $22, with one producer asking $22.50 and reporting small sales. In the Birmingham district the minimum price is $20, Birmingham base, with one furnace reporting small sales at $20.50. There is little inquiry current, and it is not expected that there will be much activity until after New Year's.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern fdy., sil. 1.75 to 2.25 (base)	$24.05
Southern fdy., sil. 2.25 to 2.75	24.55
Southern Ohio silvery, 8 per cent	$31.77 to 32.77
Southern Ohio fdy., sil. 1.75 to 2.25	24.27 to 24.77
Southern Ohio, basic	23.77
Southern Ohio, malleable	24.27 to 24.77

Sheets.—While reports are heard of low prices on black sheets, the situation as regards blue annealed and galvanized is firm. For early shipment quotations of 3.50c., Pittsburgh, on black are still being made, but 2.70c. for blue annealed and 4.75c. for galvanized are the only prices encountered. Mills in this section are quoting 4.75c. for auto body sheets, though reports are current of 4.60c. still being available.

Structural Activity.—Railroad buying is developing in this territory, inquiries from two roads totalling 1700 tons. An office building at Columbus, Ohio, will require 1400 tons of shapes. Prospects are good for the new year, as a number of projects requiring substantial tonnages are expected to come out early in January.

Reinforcing Bars.—Demand generally runs to small tonnages, but a number of projects requiring fair tonnages are being figured. Prices are steady, ranging from 1.90c. for rail steel bars to 2.10c. for new billet steel.

Warehouse Business.—The customary slowing up around the holiday period is evident, but generally business is considerably improved over the preceding months of the year. As mills are getting filled up, demand for quick delivery is becoming more insistent, and jobbers are looking for a rush of business after the first of the year. Prices are steady, and unchanged.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4.35c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds, 4.05c.; cold-rolled flats, squares and hexagons, 4.55c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.15 per 100 lb.; common wire nails, $3.15 per keg base; cement coated nails, $2.85 per keg.

Finished Materials.—Demand has been mostly for small tonnages, but there have been contracts made for first quarter at 2c. for plates and 2.10c. for bars and shapes, f.o.b. Pittsburgh. It is still possible to get a quotation of 1.90c. on plates, but there is now evident a hesitancy on the part of mills to book first quarter contracts at this figure. Some mills are expected to advance plate prices to a par with those of shapes in the near future, and it is possible that the old differential of $2 per ton may be established in the first quarter. It is reported that there are still a number of protections on bars and shapes outstanding at 2c., but these prices will be withdrawn unless specifications come in before the end of the year. There is little activity current in wire products, most mills having good order books till the end of February. The new prices are being firmly held. Activity is lacking also in bolts and nuts, as jobbers are well covered for nearby needs. Inquiries for track accessories run to carload lots, with prices steady. Cold-finished materials are in better demand, as further advances in these products are expected.

Coke.—Connellsville prices are strong, the lowest quotation on foundry coke today being $4.75 with furnace at a minimum of $4.50. Prices in other districts generally remain unchanged, though furnace coke in Wise County is not available at less than $4, ovens. By-product prices will be unchanged for January, foundry grades being quoted $6.50, Connellsville.

Old Material.—Buying by dealers constitutes the market activity, and in anticipation of heavy consumer buying prices have been advanced 50c. through the list. Consumers are showing interest, but dealers are reluctant to sell, believing that prices will go much higher.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$16.50 to $17.00
Scrap rails for melting	16.00 to 16.50
Short rails	19.50 to 20.00
Relaying rails	31.00 to 31.50
Rails for rolling	17.50 to 18.00
Old car wheels	15.50 to 16.00
No. 1 locomotive tires	18.00 to 18.50
Railroad malleable	17.50 to 18.00
Agricultural malleable	16.50 to 17.00
Loose sheet clippings	13.50 to 14.00
Champion bundled sheets	14.50 to 15.00
Per Net Ton	
Cast iron borings	13.00 to 13.50
Machine shop turnings	11.50 to 12.00
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	17.00 to 17.50
Iron axles	23.00 to 23.50
No. 1 railroad wrought	13.50 to 14.00
Pipes and flues	10.00 to 10.50
No. 1 busheling	12.00 to 12.50
Mixed busheling	10.00 to 10.50
Burnt cast	12.50 to 13.00
Stove plate	12.50 to 13.00
Brake shoes	13.50 to 14.00

Buffalo

Pig Iron Prices Advanced—Old Material Market Is Strong

BUFFALO, Dec. 22.—Advancing to a $23 base by the only local maker who was actively quoting lower adds strength to the pig iron market. The new price announced by this interest as a result of the higher prices in coke is a net advance of $1. This makes the 2.25 to 2.75 silicon grade $23.50 and the 2.75 to 3.25 silicon grade $24.50 These prices, it should be understood, are for first quarter and first half delivery. The inquiry for the week amounted to 10,000 tons including 2200 tons of malleable; 1000 tons of foundry for the American Locomotive Co. and the rest for lesser amounts, including 700 tons and 500 tons. The Bethlehem-Lackawanna plant has placed another furnace in blast, but it is understood the two idle wickwire stacks will not be in blast until possibly the end of February.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25	$23.00
No. 2 foundry, sil. 2.25 to 2.75	23.50
No. 1 foundry, sil. 2.75 to 3.25	24.50
Malleable, sil. up to 2.25	23.00
Basic	23.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—While the holiday lull pervades the market, mills are beginning to get into substantial business and reports of swelling order-books are going along with reports of increased mill operations. The bar market shows much improvement and price advance after the first of the year is contemplated by mills. Shape inquiry and ordering is better and sheets show some very general interest for first quarter. Almost all the sheet users are in the market and the price of 3.60c. for black is less frequently shaded to 3.50c. A new turnbuckle list is out effective Dec. 15, running 50 off for turnbuckles with stub and 70 off for turnbuckles without stub, both delivered prices on 1000 lb. or more. Pipe business

is improving; alloy market is weak. The Bethlehem plant at Lackawanna; the Donner and Wickwire-Spencer are all operating 85 per cent or better. The Seneca Iron & Steel Co. has its entire 12 sheet mills in operation.

Old Material.—The market is strong though buying has dropped off, except pick-up tonnages at prices dictated by mills. One mill is buying a little heavy melting steel at $17.50 to $18, but dealers have paid $20 and $20.50 for strictly No. 1 grade to fill orders. A Depew consumer recently bought 3000 tons of heavy melting steel at a price said to be around $20.50. The going price for this grade of scrap now is no less than $19.50 to $20.50. Dealers' expectations are that the heavy melting steel market will go to $21, but they do not look for resumption of heavy buying for some weeks. The turnings market has slumped off somewhat due to the Cleveland embargo. The rejection of heavy tonnages of turnings by a Cleveland concern has thrown this material on to the market for disposal anywhere. This has weakened the local market to $13.50 to $13.75. Low phosphorus is strong at $22.

We quote f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel	$19.50 to $20.00
Low phosphorus, 0.04 and under	21.00 to 22.00
No. 1 railroad wrought	16.50 to 17.00
Car wheels	17.50 to 18.00
Machine shop turnings	13.50 to 13.75
Cast iron borings	14.50 to 15.00
No. 1 busheling	17.50 to 18.00
Stove plate	15.50 to 16.50
Grate bars	14.50 to 15.00
Bundled sheets	12.50 to 13.00
Hydraulic compressed	17.50 to 18.00
Railroad malleable	17.50 to 18.00
No. 1 machinery cast	18.00 to 18.50

Boston

Pig Iron Prices Firmer—Domestic Pipe Shops Given Preference

BOSTON, Dec. 23.—Reflecting the increased cost of coke, pig iron prices are firmer and in some instances furnaces have actually advanced prices. The most active Buffalo furnace in this territory has advanced its base price $1 a ton and its No. 2X and No. 1X iron 50c., while a western Pennsylvania iron maker has advanced $1 on all grades and an Alabama 50c. Eastern and western Pennsylvania furnaces have notified local representatives they are temporarily out of market pending an analysis of the furnace coke situation. Prices at which foreign iron is offered have automatically advanced with domestic iron quotations, yet remain below the delivered basis of domestic. A sizable tonnage of foreign iron is available. Business the past week dropped off materially and as a rule was confined to small lots of more or less special iron.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 to $5.92 from western Pennsylvania; $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	$26.15 to $26.65
East. Penn., sil. 2.25 to 2.75	26.65 to 27.15
Buffalo, sil. 1.75 to 2.25	27.91
Buffalo, sil. 2.25 to 2.75	28.41 to 28.91
Virginia, sil. 1.75 to 2.25	29.42 to 29.92
Virginia, sil. 2.25 to 2.75	29.92 to 30.42
Alabama, sil. 1.75 to 2.25	29.60 to 32.10
Alabama, sil. 2.25 to 2.75	30.10 to 32.60

Cast Iron Pipe.—Boston has awarded 2200 tons 6-in. to 42-in. pipe and 300 tons fittings to the Warren Foundry & Pipe Co., and Medford, Mass., approximately 500 tons of 6-in. pipe to R. D. Wood & Co. In both instances domestic pipe makers were second lowest bidders, New York representatives of French manufacturers making the lowest price, but being turned down by the municipalities. Fitchburg has purchased 300 tons 24-in. pipe from the Donaldson Iron Co. Bids close Dec. 29 on 1500 tons 48-in. pipe wanted by Boston, and 200 tons smaller pipe required by New Bedford, Mass. Other municipalities will be in the market after the turn of the year. Pipe is quoted as follows: Class B, 4-in. and smaller, $66.10 delivered Boston common rate points; 6-in. to 16-in., $61.10; 20-in. and larger, $60.10. Differentials of $4 to $5 are asked on Class A and gas pipe.

Coke.—The movement of foundry coke to consuming plants is less active, specifications this month to date having fallen slightly under those for the corresponding time in November. Both the New England Coal & Coke Co. and the Providence Gas Co. quote by-product foundry coke at $11.50 a ton delivered within New England.

Old Material.—Although still fairly active, the old material market is less so than it was a fortnight ago, presumably because of the holiday. Prices remain strong, however, and in some cases are higher. Certain brokers are paying $15.50 to $16 a ton on cars for heavy melting steel, while others are doing business at $14.50 to $15, the price depending somewhat on the consumer. Chemical borings, which are scarce, after dipping to $14.50 to $15, snapped back to $16 to $16.50, as against $17.50, the previous high price of the year. Railroad malleable is higher at $20 to $20.50 delivered. Prices otherwise are practically unchanged. Bids close Dec. 23 on seventy-two cars of miscellaneous material offered by the Boston & Maine Railroad.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.50 to $21.00
No. 2 machinery cast	17.00 to 18.00
Stove plates	15.00 to 15.50
Railroad malleable	20.00 to 20.50

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.50 to $16.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	13.50 to 14.00
Wrought pipe (1-in. in diam., over 2 ft. long)	12.50 to 13.00
Machine shop turnings	12.00 to 12.50
Cast iron borings, chemical	16.00 to 16.50
Cast iron borings, rolling mill	10.50 to 11.00
Blast furnace borings and turnings	9.50 to 10.25
Forged scrap	10.50 to 11.00
Bundled skeleton	10.50 to 12.00
Bundled cotton ties	10.00 to 11.00
Forged flashings	12.50 to 13.00
Shafting	18.50 to 20.00
Street car axles	18.50 to 19.00
Rails for rerolling	15.00 to 15.50
Scrap rails	14.50 to 15.00

San Francisco

Structural Activity and Firmer Price-Tone Features of Current Market

SAN FRANCISCO, Dec. 19 (*By Air Mail*).—Contracts calling for 10,075 tons of structural shapes, 5809 tons of plates and about 1000 tons of reinforcing bars were placed in the Pacific Coast iron and steel market during the past 10 days. Prices are stronger, although no large general advances have been made. Some producers, however, have advanced the price of merchant bars $1, making the current quotation 2.55c. to 2.60c., carload, mill shipment.

The continued building activity in this city is noteworthy. A new high monthly record for building permits issued during the month of November was made, the total being $6,358,729, which is 3 per cent more than the October figure, which in turn was 7 per cent ahead of the September total. The November figure is 63 per cent greater than November last year, and 142 per cent over November, 1922. Plant and business building construction is an outstanding feature of the present building activity.

Pig Iron.—Buyers being well covered for their first quarter requirements, there is a slight lull in pig iron, although interest is still active. Prices remain unchanged, but the market is stronger. Prices of foreign irons, however, can be shaded for round tonnages. There is not a great deal of uniform quality imported iron available at present, and the demand for Utah iron is continually growing. Current quotations are as follows:

	Per Ton
*Utah basic	$27.25 to $28.25
*Utah foundry, sil. 1.75 to 2.25	27.50 to 28.50
**Scotch foundry	30.00 to 32.00
**English foundry	28.50 to 30.00
**Belgium foundry	26.00 to 28.00
**Indian foundry	26.00 to 28.00
**German foundry	26.00 to 28.00
*Birmingham, Ala., foundry iron, sil. 2.75 to 3.25	30.75

*Delivered in San Francisco.
**Duty paid, f.o.b. cars, shipside, San Francisco.

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Coke.—Higher prices in domestic coke are expected to be announced before the first of the year. The market is very firm, and the demand, though not large, is moderately consistent. English coke, foundry grade, is being quoted at $16.50 to $18, shipside. Birmingham, Ala., by-product is $18 to $20 delivered in San Francisco, and West Virginia beehive is $25 to $27 delivered.

Bars.—An advance of $1 was made in the price of merchant bars by some of the local producers, making the present quotation 2.55c. to 2.60c., carload. Warehouse prices are 3c. to 3.25c. base. Reinforcing bars are quoted 3.35c. carload, and 3.80c., l.c.l. Awards of the week for reinforcing bars include the following:

Women's Club building, Post Street, San Francisco, 400 tons, to Badt-Falk Co.
Zellerbach Paper Co., building, San Francisco, 150 tons, Gunn, Carle Co.
Municipal Car Barns, San Francisco, 160 tons, Gunn, Carle Co.
Grant High School, San Jose, 150 tons, Truscon Steel Co.
Benita-Carbona Irrigation District, Tracy, 150 tons, Edw. L. Soule Co.

Sheets.—Continued interest is being shown sheets, which are very firm. Quotations are: Blue annealed, 3.43c., c.i.f.; black, 4.33c., c.i.f.; galvanized, 5.58c., c.i.f Warehouse quotations are: Blue annealed, No 16, $415 per 100 lb; black, No. 26, $4.90 per 100 lb.; glavanized, No. 26, $5.75 per 100 lb.

Rails.—The Southern Pacific Railroad placed an order this week with the Colorado Fuel & Iron Co. for 22,500 gross tons of rails, and 10,780 net tons of spikes, and a similar order, for similar quantities also, with the Tennessee Coal, Iron & Railroad Co., half for delivery next year and the rest in 1926.

Plates.—Orders for plates calling for 5809 tons have recently been placed in this market. Prices are firm at 2.40c. to 2.50c., base, c.i.f. Among the awards of the week were the following, the first two having been announced in THE IRON AGE of Dec. 18:

Pan-American Oil Co., for four 100,000-bbl. tanks, 1560 tons, to United States Steel Products Co.
Pan-American Oil Co., for four 55,000-bbl. tanks, 800 tons, to Western Pipe & Steel Co.
Pan-American Oil Co., for eight 37,000-bbl. tanks, 1360 tons, to Western Pipe & Steel Co.
Associated Oil Co., for three 80,000 bbl., tanks, 900 tons, to Western Pipe & Steel Co.
Associated Oil Co., for three 80,000 bbl., tanks, 900 tons, to Lacey Mfg. Co., Los Angeles.
St. Helens pipe line, St. Helens, Ore., 289 tons, Coast Culvert & Flue Co.

Structural Material.—Shapes are firm at 2.45c. to 2.55c. base, c.i.f. Construction work is large, and lettings for structural steel during the past ten days exceeded 10,000 tons. The contract for the Matson Navigation Co. new liner to ply between San Francisco and Honolulu, 4000 tons of structural steel and 8000 tons of plates, was awarded to the William Cramp & Sons Ship & Engine Building Co., Philadelphia. Projects of several thousand tons are pending.

Old Material.—Prices are unchanged, the amount of buying is comparatively small, and stocks in yard are fair. No. 1 gray cast iron, cupola size, is quoted at $21 per net ton. Heavy melting steel is firm at $11. The price in Los Angeles is $1 lower.

Prices for scrap delivered to consumers' yards are as follows:

	Per Gross Ton
No. 1 heavy melting steel	$11.00 to $12.00
Scrap rails, miscellaneous	11.00 to 12.00
Rolled steel wheels	11.00 to 12.00
Couplers and knuckles	11.00 to 12.00
Mixed borings and turnings	6.00 to 6.50
Country mixed cast scrap	8.50 to 9.00

A distribution of $2,000,000 has been made by the Ford Motor Co. to its 36,000 employees, it became known last week, when it was stated that Ford investment certificates, available only to employees, would pay 14 per cent interest for 1924.

More bituminous coal was produced in the week ended Dec. 13 than in immediately previous weeks, the total being 10,723,000 net tons, compared with 10,612,000 tons and 9,640,000 tons in the two preceding weeks. The current figure compares with 9,936,000 tons in the corresponding week of 1923. The total production for the year is less, however, being 444,520,000 tons, compared with 524,136,000 tons last year.

Cleveland

Heavy Specifications Coming in—Radiator Company Buys Large Tonnage of Pig Iron

CLEVELAND, Dec. 22.—While the heavy rush for steel has subsided, specifications held up well during the week and some consumers sent in orders for January shipments of considerable of the material they have under contract for the first quarter. New buying was generally confined to small lots.

Pig iron prices again advanced because of higher production costs due to the advance in coke and several furnaces are refusing to quote for the second quarter, for which there is now considerable inquiry. Automobile manufacturers are freely buying material in sheets and strip steel, some contracting only for January and others for February or a full quarter. While some of the automobile companies are slowing down for inventories, parts makers in some cases are increasing operations and ordering steel more freely. The Pere Marquette Railroad has placed 10,000 tons of rails, 4000 tons with the Illinois Steel Co., 4000 tons with the Bethlehem Steel Corporation and 2000 tons with the Inland Steel Co. The New York Central Railroad is reported to have purchased 10,000 tons of tie plates.

Pig Iron.—Prices have again advanced 50c. to $1 a ton because of the higher production cost due to the raise of wages by independent coke producers. One furnace has been advised that the advance in the price of coke under its contract amounts to $1.14 per ton. Sales held up well during the week, those made by Cleveland interests aggregating 40,000 tons. Much of this was for the second quarter and there is a good volume of inquiry for the same delivery, but several producers will not quote beyond the first quarter. Some that have by-product plants do not know what their cost will be, as they have not yet contracted for coal, which is stiffening. The outstanding purchase was by the American Radiator Co., which is understood to have bought approximately 60,000 tons of foundry iron for its various plants for the second quarter. Of this 5000 tons for Detroit went to Detroit furnaces and 3800 for Springfield, Ohio, to a southern Ohio furnace. An Eastern radiator manufacturer is inquiring for 3000 tons. In Cleveland one seller has advanced its price to $23 at furnace for both local and outside delivery, at which 400 tons was sold. Another local furnace has withdrawn from the market. Other Lake furnaces are now quoting $22.50 to $23, but only for the first quarter. Considerable foundry iron was sold by Valley furnaces during the week at $22, but it is doubtful whether any more can be had at the same price and one producer has advanced its Valley price to $23. Furnaces are now asking $21.50 to $22 for basic iron. An Ohio foundry is inquiring for 1000 tons. We note the sale of 500 tons of low phosphorus iron to a Pittsburgh consumer at $28, but $28.50 is now the minimum quotation for this grade. The Hanna Furnace Co. blew in its Cherry Valley furnace at Leetonia, Ohio, Dec. 20. This was out for relining.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.50 to $22.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25	23.50
Southern f'dy., sil. 1.75 to 2.25	26.01 to 26.51
Malleable	23.50
Ohio silvery, 5 per cent	32.52 to 33.52
Stand. low phos., Valley furnace	28.50 to 29.00

Semi-Finished Steel.—Prices of semi-finished steel are firmer and the available supply is very limited. A local mill has sold 600 tons of billets and slabs to a Chicago consumer and 100 tons of billets in northern Ohio at $40, Cleveland, for the first quarter. The market on a Youngstown basis is regarded as about $37.50 for billets and $38.50 for sheet bars, although mills located in Youngstown are sold up and out of the market.

Steel Bars, Plates and Structural Material.—The plate market is very firm at a minimum price of 1.90c., Pittsburgh, but most mills are now on a 2c. basis. Quotations below 2.10c. on structural material seem to have disappeared and steel bars are firm at that price.

Jobbers quote steel bars, 3.10c.; plates and structural shapes, 3.20c.; No. 28 black sheets, 4.35c.; No. 28 galvanized sheets, 5.45c.; No. 10 blue annealed sheets, 3.45c. to 3.60c.; cold-rolled rounds, 4c.; flats, squares and hexagons, 4.50c.; hoops and bands, 1 in. and wider and 20 gage and heavier, 3.85c.; narrower than 1 in., all gages, 4.35c.; No. 9 annealed wire, $3.15 per 100 lb.; No. 9 galvanized wire, $3.60 per 100 lb.; common wire nails, $3.25 base per 100 lb.

Sheets.—Mills generally are comfortably filled for the first quarter and are holding to regular quotations, but blue annealed sheets are being shaded $2 a ton to 2.60c. for early shipment and auto body sheets can still be had at 4.60c. for December rolling.

Reinforcing Bars.—The demand is light and mills making rail steel bars are in need of orders. Consequently, while 1.90c., Pittsburgh, is the ruling price, this might be shaded for a round lot.

Bolts, Nuts and Rivets.—While the new method of selling bolts and nuts at delivered prices appears generally to have met with favor, some complaints coming from car-lot buyers who have lost the advantage over buyers of smaller lots because of the lower freight rates which they had on car lots when basing points were used. Jobbers at former basing points also complained because they no longer have an advantage over competitors who formerly had to pay freight on shipments. Consumers are specifying heavily on fourth quarter contracts. The larger production of rivets in this territory is by bolt and nut manufacturers who are now quoting 70 per cent off list, delivered, as compared with 70, 10 and 5 per cent off list, Cleveland or Pittsburgh, quoted by makers of large rivets. Round lots for the first quarter placed during the week by Detroit automobile makers brought out price shading to around 75 per cent off list with freight allowed.

Iron Ore.—The consumption of Lake Superior ore during November amounted to 3,688,726 tons, an increase of 190,934 tons over October. This compares with a consumption of 4,441,477 tons in November, 1923. On Nov. 30 there were 177 furnaces in blast using lake ore, a gain of 22 for the month. The amount of ore on hand at furnaces and Lake Erie docks Dec. 1 was 40,178,035 tons as compared with 42,836,466 tons on Dec. 1, 1923.

Coke.—The advance in wages by independent producers has resulted in a price stiffening on the cheaper grades of foundry coke, but has not yet affected the higher priced grades. On standard Connellsville foundry coke $5 now appears to be the minimum price, with some producers quoting $5.50.

Old Material.—A Youngstown mill is reported to have purchased a round tonnage of scrap the past week at $22.50 for heavy melting steel, $20.50 for compressed sheet steel and $18 to $18.50 for flashings. Locally the market is inactive. While open-hearth grades are strong, the market lacks firmness on the blast furnace grades of machine shop turnings and mixed borings and turnings because one local consumer still has an embargo and another is holding back on shipments. However, prices on these grades are unchanged. Flashings are 25c. a ton higher. Valley dealers are offering $22 for heavy melting steel.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$18.75 to $19.00
Rails for rolling	18.75 to 19.00
Rails under 3 ft.	21.00 to 21.50
Low phosphorus melting	21.50 to 22.00
Cast iron borings	16.00 to 16.25
Machine shop turnings	15.75 to 16.00
Mixed borings and short turnings	16.00 to 16.50
Compressed sheet steel	16.00 to 16.50
Railroad wrought	16.00 to 16.50
Railroad malleable	19.50 to 19.75
Light bundled sheet stampings	13.75 to 14.00
Steel axle turnings	16.50 to 17.00
No. 1 cast	20.00 to 20.50
No. 1 busheling	15.50 to 16.00
Drop forge flashings	15.00 to 15.50
Railroad grate bars	16.00 to 16.25
Stove plate	16.00 to 16.25
Pipes and flues	14.25 to 14.50

Philadelphia

Pig Iron Beginning to Reflect Expected Coke Increase—Ferromanganese Advanced

PHILADELPHIA, Dec. 22.—Prices continue strong and in some instances have registered advances despite the pre-holiday dullness and general lack of activity in all lines. Mills are well booked on most products through January and in some cases into February. As a result the attitude toward further business for first quarter delivery is one of firmness, based on the expectation of a continuation of activity after the holiday and inventory period.

There is considerable speculation as to the probable extent of the increase in pig iron prices that is expected to result from the added cost of coke after the first of the year. The additional cost to the furnace per ton of iron is placed all the way from about 65c. per ton to $1.60 per ton, depending upon whether it is believed coke will advance 75c. or $1.25 per ton.

The effort to bring plates back into line with bars and shapes has succeeded to the extent of a minimum first quarter quotation of 2c. per lb., Pittsburgh, with makers showing no inclination as yet to shade this price.

Pig Iron.—The unusual situation is presented of prices advancing rapidly in a quiet year-end market. Furnaces are fairly well booked with tonnage for first quarter and a general sentiment toward higher prices has been enhanced by the knowledge that after the first of next month producers of pig iron will find coke costs increased as a result of advances in the wages of coke workers in the Connellsville district. It is felt that this means the advance before long of wages in all coke districts. The rise in the cost of coke is expected to be about $1 a ton. As the non-union fields have been paying wages of about 60 per cent of the H. C. Frick Co. scale, the advance may mean as much as 40 per cent more on the payroll. As the average coke consumption is about 2000 lb. for a gross ton of basic iron and from 2400 to 2700 lb. or more for foundry, depending upon the percentage of silicon, furnaces on foundry will feel the higher costs particularly. Basic iron is quiet and in the absence of actual sales, the range is nominally $23.50 to $24.50 per ton, delivered eastern Pennsylvania, although it is doubtful that less than $23.50 per ton, furnace, could be done today. Foundry is firm on a basis of $23.50, with several sellers quoting $24 base.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.26 to $25.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.01 to 25.88
East. Pa. No. 1X	26.01 to 26.88
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 29.67
Virginia No. 2X, 2.25 to 2.75 sil.	29.67 to 30.17
Basic delivered eastern Pa.	23.50 to 24.50
Gray forge	23.50 to 24.00
Malleable	24.00 to 24.50
Standard low phos. (f.o.b. furnace)	25.50 to 26.50
Copper bearing low phos. (f.o.b. furnace)	25.50 to 26.00

Billets.—Semi-finished material is slow to advance, although mills are fairly well filled with first quarter business for the next month or six weeks. While $37, Pittsburgh, is quoted on rerolling billets for contracts covering the full first quarter, for delivery during January or into February, $36 or slightly less is reported obtainable. Forging billets are quoted at $41 to $42 per ton, Pittsburgh.

Bars.—While 2c. per lb., Pittsburgh, is still obtainable, the tendency is toward 2.10c. for any delivery in the first quarter. Generally mills are working on a better backlog of orders on bars than on other products, which is reflected in the firmness of prices. Iron bars continue at 2.15c. mill, or 2.05c. to 2.10c. per lb., Pittsburgh, for first quarter.

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Shapes.—There is still some weakness in evidence, although 2c. to 2.10c. per lb., Pittsburgh, is the range of quotations. Under special circumstances the 2c. quotation has been shaded slightly, but this weakness is expected to disappear after the first of the month. Fabricators are not as active as they have been in the past few weeks, current projects being confined to small lots of steel.

Plates.—Success seems near at hand in the effort to bring plates into line with bar and shape quotations. With 2c. per lb., Pittsburgh, the minimum of eastern Pennsylvania mills, 2.10c. per lb. is being asked by some, willing to consider full first quarter contracts running into March.

Sheets.—Blue annealed sheets are firm at 2.70c. per lb., Pittsburgh. Black sheets are firm at 3.60c. per lb. for first quarter contracts, but all weakness has not entirely disappeared.

Ferromanganese.—Prices have been advanced by foreign and domestic sellers to $110 per ton, seaboard or furnace. As consumers have covered rather well for first quarter at the previous price of $105, practically no business is being transacted at the new price.

Old Material.—Heavy melting steel is evidently firmly established at $21 per ton, delivered eastern Pennsylvania. A Claymont, Del., consumer has closed on a round tonnage of heavy melting steel at $21 and it is considered doubtful that less than this price could be obtained unless by a mill favorably located for freight rates. No. 1 cast is still inactive, but a recent sale to a New Jersey consumer justifies a range of $20 to $21 per ton. Turnings are being bought at $17, in some instances, to fill $17 orders. A large eastern Pennsylvania consumer of machine shop turnings is still paying $17 per ton. Heavy breakable cast is firm at $19 to $19.50 per ton and more active than No. 1 cast.

Imports.—In the week ended Dec. 20 a total of 6893 gross tons of iron ore came into the Port of Philadelphia, 5807 tons from Algeria and 1086 tons from Germany. Only 503 tons of pig iron was received, all from India. Of structural material, 155 tons of shapes came from Belgium. A total of 531 tons of ferromanganese arrived from the United Kingdom.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$21.00
Scrap rails	20.00 to 21.00
Steel rails for rolling	20.00 to 21.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Couplers and knuckles	22.50 to 23.50
Rolled steel wheels	22.50 to 23.50
Cast-iron car wheels	19.50 to 20.00
No. 1 railroad wrought	21.00 to 22.00
No. 1 yard wrought	18.00 to 19.00
No. 1 forge fire	17.00 to 17.50
Bundled sheets (for steel works)	17.00 to 17.50
Mixed borings and turnings (for blast furnace use)	13.50 to 15.00
Machine shop turnings (for steel works use)	17.00 to 17.50
Machine shop turnings (for rolling mill use)	17.00 to 17.50
Heavy axle turnings (or equivalent)	18.00 to 18.50
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	20.00 to 21.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	18.50 to 19.00
Railroad grate bars	16.50 to 17.00
Stove plate (for steel plant use)	16.50 to 17.00
Wrought iron and soft steel pipes and tubes (new specifications)	18.00 to 18.50
Shafting	25.00 to 26.00
Steel axles	25.00 to 26.00

Heavy Melting Scrap Advances in Youngstown Market

YOUNGSTOWN, Dec. 22.—Heavy melting scrap has advanced to a range of $22 to $22.50 in this district, with basic and No. 2 foundry irons on a parity. Melters are still doing little buying, because they believe scrap prices are out of line.

The Youngstown Sheet & Tube Co. has made a substantial paper profit on a large tonnage of scrap metal, estimated at 100,000 tons, purchased some time prior to the election.

Canadian Scrap Market

TORONTO, ONT., Dec. 20.—While business in the iron and steel scrap market is showing the effects of the present holiday season, with trading almost at a standstill, prices in both Toronto and Montreal markets have again become active with a number of changes announced for the past week. In the Toronto market, dealers have advanced their buying prices on steel and machine shop turnings $2 per gross ton and are now offering $11 for these materials; wrought pipe is up $1 with dealers offering $7 per gross ton; No. 1 wrought scrap is now being purchased by dealers at $13 per gross ton; heavy melting steel $12.75 per gross ton, Toronto, and $15 as the outside price delivered Hamilton, Ont., and steel axles are up $1 per ton to $17 as dealers' buying price, Toronto. Montreal dealers are offering $10 for steel turnings; $9 per gross ton for machine shop turnings and wrought pipe and $12 per gross ton for heavy melting steel. No change is reported in No. 1 machinery cast which is being purchased by Toronto dealers at $18 and Montreal dealers at $17 per net ton, in large quantity lots. While some of the larger consumers have covered for first quarter needs, there are many who continue to buy as demands dictate and up to the past week or two a fairly good demand prevailed for scrap on spot account. The present slump in demand is almost entirely the result of the present holiday season, but in the Montreal district the lack of orders for finished materials is reflected in the scrap market, where the demand is said to be almost stagnant. Trading between dealers is not as active as it was a month or six weeks ago, but local dealers are not overlooking opportunities to add to their holdings when the price is right.

Dealers' buying prices are as follows:

Gross Tons

	Toronto	Montreal
Steel turnings	$11.00	$10.00
Machine shop turnings	11.00	9.00
Wrought pipe	7.00	9.00
No. 1 wrought scrap	13.00	13.00
Heavy melting steel	12.75	12.00
Steel axles	17.00	19.00
Axles, wrought iron	19.00	20.00

Net Tons

Standard car wheels	17.00	17.00
Malleable scrap	14.00	15.00
Stove plate	14.00	13.00
No. 1 machinery cast	18.00	17.00

High-Speed Steel for Small Tools

A. H. d'Archambal, metallurgist, Pratt & Whitney Co., Hartford, Conn., was the speaker at the December meeting of the Boston chapter of the American Society for Steel Treating, held Thursday evening, Dec. 18, at the Massachusetts Institute of Technology. It was largely attended. V. O. Homerburg, Massachusetts Institute of Technology, chairman, presided.

Mr. d'Archambal's address largely concerned carbon tool and high-speed steels used in the manufacture of small tools, but in addition he analyzed the various kinds of steel used and their qualifications for the uses to which they are put. He stated emphatically his disbelief in so-called semi-high-speed steels, claiming manufacturers of small tools should confine themselves to either carbon or high-speed tool steels, or both. He also took exception to buying of steel under brand names as advocated by some of the steel companies. A large number of tools, as well as fractured specimens and lantern slides, were exhibited as illustrations.

In discussing steels used in the manufacture of ground thread high-speed taps, it was announced that the Pratt & Whitney Co. has devised a new method of grinding which is proving highly satisfactory. In connection with stay bolt taps, Mr. d'Archambal stated that railroads are beginning to specify spiral fluted taps, the use of which in railroad shops is growing very fast. Several specimens were submitted showing grinding cracks as well as highly interesting comparative readings on hardness with Rockwell and Brinell testing machines.

Large Ferroalloy Company Absorbed by Vanadium Corporation

The United States Ferro Alloy Co., New York, has been absorbed by the Vanadium Corporation of America. The alloy company is the second largest producer of 50 per cent ferrosilicon and standard ferrochromium alloys in the country with a plant at Niagara Falls, N. Y. Alfred A. Corey, Jr., president of the Vanadium company, who made the announcement on Monday, Dec. 22, becomes president and L. K. Diffenderfer, treasurer. The latter is also treasurer of the Vanadium organization. It is stated that the corporate organization of the ferroalloy company will be maintained and that it will actively function as in the past.

Meetings of Mechanical Engineers

The following list covers meetings to be held by various sections of the American Society of Mechanical Engineers:

Atlanta, Jan. 15.—Chamber of Commerce Building, at 8 p. m. Subject: Vocational Training, with Special Reference to Training of Technical Employees. Speaker: Kendall Weisinger, educational director, Southern Bell Tel. & Tel. Co.

Cincinnati, Jan. 22.—At University of Cincinnati. Subject: Demonstration of New Heat-Resisting Steel. Speaker: J. G. Donaldson, vice-president, Mosler Safe Co.

Cleveland, Jan. 13.—At Hotel Winton. All day meeting. Subject: Symposium on Pulverized Fuel. Speakers: J. Wolff, Cleveland; John Anderson, Milwaukee; E. H. Tenney, St. Louis, and Paul Thompson, Detroit.

New Haven, Jan. 6.—At Mason Laboratory, at 8 p. m. Subject: Sales Engineering. Speaker: Willard E. Freeland, associate professor at Massachusetts Institute of Technology.

Toledo, Jan. 15.—At Toledo Chamber of Commerce. Subject: Strong Alloys of Aluminum, illustrated with lantern slides. Speaker: Dr. Zay Jeffries of the Aluminum Co. of America.

Youngstown Steel Makers Optimistic at the Closing of the Year

YOUNGSTOWN, Dec. 22.—Steel makers close 1924 with considerable optimism for the new year, as unfilled order books represent a substantial tonnage and prices are strengthening.

After a lapse of four years the Bessemer Limestone & Cement Co. has restored dividends on common stock, directors declaring a payment of 1½ per cent, payable Jan. 10 to holders of record Dec. 20. The company reports a satisfactory year, but shipments of fluxstone were below those in 1923 because of the depression during the summer in the iron industry.

Directors of the General Fireproofing Co., a fabricating interest, have declared an extra dividend of 40c. per share on common stock for the last quarter of this year, bringing total payments for the junior issue to $1.60 for the year.

The Youngstown Sheet & Tube Co. has decided to hold in abeyance additional financing proposed in connection with expansion in the Chicago area. The company believes its position six months hence will be so favorable that financing will be unnecessary at that time.

Owing to the fact that it has been obliged to enter the market in a larger way than usual for semi-finished steel supplies, the Trumbull Steel Co. at Warren, Ohio, will likely expedite in 1925 the construction of additional open-hearth furnaces. Its present group of seven open hearths is unable to meet the steel requirements of its rolling mills.

To Develop Standards for Machine Pins and Washers

The American Society of Mechanical Engineers has accepted sole sponsorship for the standardization of taper pins, straight pins, split pins, dowel pins, plain washers, and lock washers, and is organizing a sectional committee to carry on the work. The subject was brought to the attention of the American Engineering Standards Committee by the acting chief of ordnance of the War Department, and through the A. E. S. C. sponsorship was offered to the A. S. M. E. and accepted by its council.

All societies, associations and government departments which are known to be interested in this project are being asked to appoint official representatives on the sectional committee. The A. S. M. E., 29 West Thirty-ninth Street, New York, will welcome any information relative to the subject, the importance of which will be readily recognized by all those engaged in the manufacture of machines of various kinds.

Youngstown Industrial Developments

YOUNGSTOWN, Dec. 22.—Steel makers with their own blast furnaces have withdrawn from the merchant iron market on new tonnages.

The advance in wages in the Connellsville coke regions is expected to work some disadvantage on iron producers without by-product coke oven plants or beehive oven connections, and dependent on the market for their supplies.

While new buying has shown more moderate tendencies lately in finished steel lines, mills have heavy backlogs, in most cases sufficient to maintain production at the current rate well into the first quarter.

American Ships Under Construction

On Dec. 1 American shipyards were building or had under contract for private owners 161 steel vessels of 177,166 tons gross register, compared with 132 steel vessels of 167,287 tons on Nov. 1, according to the Bureau of Navigation. In addition, 13 wooden vessels of 7245 tons were building on Dec. 1, compared with 15 wooden vessels of 9341 tons on Nov. 1.

Nearly one-third the tonnage was accounted for by 12 ships of 51,700 tons in the yard of the Newport News Ship Building & Dry Dock Co. The American Ship Building Co., Cleveland, had three ships of 21,307 tons. The American Bridge Co., Pittsburgh, had 42 steel barges of 19,500 tons total and the Dravo Contracting Co., Pittsburgh, 38 of 16,400 tons.

Records in Railroad Freight Handling

It is pointed out by the American Railway Association that the high record of freight movement in October was obtained without car shortage, partly because the average daily movement per freight car during that month was 30.7 miles. This is the highest figure ever reached, it having been equalled in October of last year. The average number of cars per train was the greatest on record, being 48.3, compared with 41.3 in 1923 and with 38.4 in 1920, the two previous record years. The average load of freight per train was the greatest on record, having been 770 tons, compared with 722 tons in 1923 and 737 tons in 1920. Consequently more freight was handled with fewer locomotives than ever before. The average speed per freight train was 11.4 miles per hour, without allowing for the various delays.

Industries in Youngstown will pay $2,500,000 in fourth quarter dividends Jan. 1, the principal disbursements to be made by the Sheet & Tube and the Trumbull companies, which are making their usual payments on preferred and common stocks.

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REPLIES TO SENATOR COUZENS

Commissioner Blair Explains Policy as to Amortization of Steel Plants

WASHINGTON, Dec. 23.—Commissioner David H. Blair of the Bureau of Internal Revenue last week issued a statement in reply to charges by Senator Couzens of Michigan that the United States Steel Corporation and other industries had escaped the payment of taxes through excessive allowance for amortization. The statement of Mr. Blair follows:

"During the war the great industries in this country, in most instances at the direct request of some Government agency, installed large plant facilities for the production of articles contributing to the prosecution of the war. In many cases the industry was assured by the Government agency before it began construction that it would be made whole after the war. War prices had to be paid. When the war did end these facilities in large part were no longer necessary to the peacetime requirements of the industry. The revenue act of 1918, passed immediately after the armistice, provided for the amortization of these facilities, that is, for a credit to the industry of the difference between the war cost and the post-war value of the facilities to the industry. Necessarily, a determination of the amount of amortization required detailed examination by engineers of the actual physical properties, which has taken much time; for example, the amortization due the United States Steel Corporation, the largest industry involved, has not yet been finally determined in the Bureau of Internal Revenue, and in the ordinary course considerable time must elapse before the tax of this corporation is finally adjusted.

Reasonable Allowance

"The law requires that the taxpayer be given a reasonable allowance for amortization. What constitutes a reasonable allowance is in large part a question of judgment, which must be submitted to and determined by the officers of the Bureau of Internal Revenue to whose decision this matter is left by the law. On questions as complicated as these, men may honestly differ as to what constitutes in every case a reasonable allowance, and it frequently happens within the bureau itself that there is a sharp conflict of opinion. Under such circumstances it is not surprising that the special committee investigating the Bureau of Internal Revenue may express disagreement with some determination of judgment as to the reasonableness of a particular amortization allowance.

"The public should bear in mind, first, that there is no provision for amortization in the present law, but the amortization of the cost of war facilities is entirely a war measure and once settled will not arise again; second, these war questions should be finally closed so that the country may know where it stands and, third, the determination of a reasonable allowance for amortization as required by the law is a matter of judgment. An honest attempt has been made to exercise this discretion with due regard to the law and regulations. The Bureau of Internal Revenue does not claim infallibility, but I think its employees have accomplished much under the very difficult conditions resulting from post-war adjustment."

Did Senator Violate Law?

Following the charges made by Senator Couzens, it was stated that officials of the Treasury Department and the Department of Justice had taken up consideration of the question as to whether he had violated the law requiring secrecy for income tax returns. It was recalled that the Department of Justice has instituted proceedings against a number of daily newspapers which had published names of taxpayers and the amount of taxes paid only. The charges of Mr. Couzens went into rather elaborate detail. Being a senator and speaking as chairman of the special committee investigating the Internal Revenue Bureau, it was suggested that Mr. Couzens has certain immunity but it was seriously questioned if it would extend to the length to which he went. The Department of Justice has not indicated whether it will begin proceedings against the senator and meanwhile it is doubted if anything will be done.

Increasing Electrification of French Mines

It is observed that with the rehabilitation of the war-damaged mines in the Pas-de-Calais, France, much progress has been made in the application of electric power equipment. Exact comparisons with 1923 are difficult since reconstruction is yet uncompleted, but what figures are available clearly indicate the trend.

In 1913 there were 1303 steam driven units rated at 127,762 hp.; in 1923 there remained only 398 such units, aggregating 66,360 hp. On the other hand, against 85 electrically operated generating untis in 1913 with a total rating of 90,636 hp., are compared 97 such units in 1923 representing total capacity of 249,910 hp. Here is an increase of almost 200 per cent. Much of the gain in motors, as well as in other items, is a direct result of the broader application of modern electric drive in modern French mining operations.

Machine Tool Builders Meet at Rockford

At a regional meeting at Rockford, Ill., Dec. 9, of the National Machine Tool Builders' Association, the members reported considerable domestic inquiry, which was expected to develop into orders after the first of the year. Very little foreign business seemed to be moving.

The topic of expositions was discussed. The feeling was that one exposition in the East and one in the West each year was quite sufficient for the machine-tool industry.

A regional committee on market research was appointed consisting of E. P. Welles, Charles H. Besley & Company, Chicago; Chester Hoefer, Hoefer Mfg. Co., Freeport, Ill., and G. A. Markuson, Rockford Milling Machine Co., Rockford, Ill. This committee is to study and report on projects of market research that would benefit the machine-tool industry. In connection with other regional committees on the subject, recommendations are to be presented to the spring convention.

A discussion of motor standardization led to the suggestion that the machine groups most interested in motor standardization could well take the lead, that perhaps the milling machine group should organize a committee of its engineers who could decide what this group most needed in the way of motor standardization. Then the influence of the whole organization could be put behind this committee of engineers to secure motors of the dimensions that this committee would recommend for milling machines. If other groups are sufficiently interested, their engineers could cooperate with the milling machine group's committee. The question was how to get a start, and this seemed to be a practical way to do it.

It has been definitely decided to build a 750-kw. steam turbine plant at Aden, India. Plans provide for three 250-kw. units to be installed, each of which will consist of turbines with 6600-volt, 3-phase alternators. It is expected that the plant will be ready for operation in September, 1925. Details may be obtained from Donald Renshaw, trade commissioner, Bombay.

An official of the Sharon Steel Hoop Co. at Sharon, Pa., states that 1924 was one of the best years the company has experienced, and the outlook for 1925 is very bright. The company is being pressed for deliveries.

Prices of Finished Iron and Steel Products (Carload Lots)

Tank Plates

F.o.b. Pittsburgh mills, base, per lb.....1.90c. to 2.10c.
F.o.b. Chicago, base, per lb.....2.20c.

Structural Shapes

F.o.b. Pittsburgh mills, base, per lb.....2.10c.
F.o.b. Chicago, base, per lb.....2.20c.

Iron and Steel Bars

Soft steel bars f.o.b. P'gh mills, base, per lb.....2.10c.
Soft steel bars f.o.b. Chicago, base, per lb.....2.10c.
Reinforcing steel bars f.o.b. P'gh mills, base, per lb....2.10c.
Rails steel bars f.o.b. Chicago district mills, base, per lb..2c.
Common iron bars delivered New York, base, per lb....2.34c.
Common iron bars f.o.b. Chicago, base, per lb.....2c.
Refined iron bars f.o.b. P'gh mills, base, per lb..2.90c. to 3.00c.
Common iron bars delivered Philadelphia, base, per lb..2.32c.

Hot-Rolled Flats

(Pittsburgh)

Hoops, base, per lb.....2.50c.
Bands, base, per lb.....2.40c. to 2.50c.
Hoops and bands, narrower than 1-in., base per lb.....2.75c.
Strips, 10 in. and wider, base, per lb.....2.25c.
Strips, less than 10 in. wide to 3 in.....2.40c.
Strips, 3 in. wide and less, base, per lb.....2.50c.

Cold-Finished Steel

Screw stock and shafting, f.o.b. P'gh mills, base, per lb..2.80c.
Screw stock and shafting f.o.b. Chicago, base, per lb..2.80c.
Screw stock, Worcester mills, base, per lb.....3.00c.
Screw stock, base, per lb., Cleveland.....2.85c.
Shafting, ground, f.o.b. mill, base, per lb.....3.20c.
Strips, f.o.b. P'gh mills, base, per lb.....4.00c. to 4.15c.
Strips, f.o.b. Cleveland mills, base, per lb.....4.15c.
Strips, f.o.b. Chicago mills, base, per lb.....4.45c.
Strips, f.o.b. Worcester mills, base, per lb.....4.30c.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

Nails, base, per keg.....$2.85
Bright plain wire, base, No. 9 gage, per 100 lb..... 2.60
Annealed fence wire, base, per 100 lb..... 2.75
Galvanized wire No. 9, base, per 100 lb..... 3.20
Galvanized barbed, base, per 100 lb..... 3.55
Galvanized staples, base, per keg..... 3.55
Painted barbed wire, base, per 100 lb..... 3.30
Polished staples, base, per keg..... 3.30
Cement coated nails, base, per count keg..... 2.25
*Bale ties, carloads to jobbers....75, 15 and 5 per cent off list
*Bale ties, carloads to retailers....75, 10 and 6 per cent off list
Woven wire fence, base, per net ton to retailers.....67.00

Chicago district mill prices are $2 per ton above the foregoing and Chicago delivered prices are $3 per ton above the prices f.o.b. Cleveland and Pittsburgh. Birmingham mill prices $3 a ton higher; Worcester Mass., mills $3 a ton higher on products of that plant, and Duluth, Minn., mills $2 a ton higher; Anderson, Ind., $1 higher.

*F.o.b. Cleveland.

Sheets

Blue Annealed
(base) per lb.

Nos. 9 and 10, f.o.b. Pittsburgh dist. mill.....2.70c.
No. 9 and 10 (base) per lb., f.o.b. Chicago dist. mills..2.80c.

Box Annealed, One Pass Cold Rolled

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.....3.60c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill.....3.70c.

Galvanized

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mill.....4.75c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill.....4.85c.

Tin-Mill Black Plate

No. 28 (base) per lb. f.o.b. Pittsburgh dist mill.....3.60c.
No. 28 (base) per lb., f.o.b. Chicago dist. mills.....3.70c.

Automobile Body Sheets

No. 22 (base) per lb., f.o.b. mill.....4.75c.

Long Ternes

No. 28 (base) 8-lb. coating, per lb., f.o.b. mill.....4.90c.

Tin Plate

Standard cokes, per base box f.o.b. Pittsburgh district Mills.....$5.50
Standard cokes, per base box f.o.b. Chicago district mills 5.60
Standard cokes, per base box f.o.b. Elwood, Ind..... 5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.20	20-lb. coating I. C.	$15.50
8-lb. coating I. C.	11.50	25-lb. coating I. C.	17.00
15-lb. coating I. C.	14.35	30-lb. coating I. C.	18.35
		40-lb. coating I. C.	20.35

Rivets

Large, f.o.b. P'gh and Cleveland mills, base, per 100 lb..$2.60
Large, f.o.b. Chicago, base, per 100 lb..... 2.75
Small, f.o.b. P'gh and Cleveland mills
70, 10 and 5 per cent off list
Small (freight allowed within zone limits).....70 off list

Rails and Track Equipment

(F.o.b. mill)

Rails, standard, per gross ton.....$43.00
Rails, light, billet, base, per lb.....1.80c. to 1.90c.
Rails, light rail steel, base, per lb.....1.65c. to 1.75c.
Spikes, 5/16 in. and larger, base, per 100 lb.....$2.90 to $3.20
Spikes, 1/2 in. and smaller, base, per 100 lb..... 3.00 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.25
Track bolts, all sizes, base, per 100 lb..... 3.80 to 4.25
Tie plates, per 100 lb..... 2.35 to 2.50
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

(F.o.b. Pittsburgh district mills)

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
1/8	45	19 1/2	1/4 to 3/8	+11	+39
1/4 to 3/8	51	25 1/2	1/2	22	2
1/2	56	42 1/2	3/4	28	11
3/4	60	48 1/2	1 to 1 1/2	30	13
1 to 3	62	50 1/2			

Lap Weld

2	55	43 1/2	2	33	7
2 1/2 to 6	59	47 1/2	2 1/2	26	11
7 and 8	56	43 1/2	3 to 6	28	13
9 and 10	54	41 1/2	7 to 12	26	11
11 and 12	53	40 1/2			

Butt Weld, extra strong, plain ends

1/8	41	24 1/2	2 to 3	61	50 1/2
1/4 to 3/8	47	30 1/2	1/4 to 3/8	+11	+54
1/2	53	42 1/2	1/2	21	7
3/4	58	47 1/2	3/4	28	12
1 to 1 1/2	60	49 1/2	1 to 1 1/2	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	15
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	7
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts are increased (on black by one point, with supplementary discount of 5 per cent and (on galvanized) by 1 1/2 points, with supplementary discount of 5 per cent.

NOTE—The above discounts on steel pipe also apply at Lorain and Youngstown, Ohio, and Wheeling, W. Va. Chicago district mills have a base 2 points less. Chicago delivered base 2 1/2 points less.

Boiler Tubes

(F.o.b. Pittsburgh)

Lap Welded Steel		Charcoal Iron	
2 to 2 1/4 in.	27	1 1/2 in.	+18
2 1/2 to 2 3/4 in.	37	1 3/4 to 1 7/8 in.	+ 8
3 in.	40	2 to 2 1/4 in.	— 2
3 1/4 to 3 3/4 in.	42 1/2	2 1/2 to 3 in.	— 7
4 to 13 in.	46	3 1/4 to 4 1/2 in.	— 9

Beyond the above discounts, 5 fives extra are given on lap welded steel tubes and 2 tens on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	55-58	3 and 3 1/4 in.	36-39
1 1/4 and 1 1/2 in.	47-50	3 1/2 and 3 3/4 in.	37-40
1 3/4 in.	31-34	4 in.	41-44
2 and 2 1/4 in.	22-25	4 1/2 in and 5 in.	33-37
2 and 2 3/4	32-35		

Hot Rolled

3 and 3 1/4 in.	38-41	4 in.	43-46
3 1/2 in. and 3 3/4 in.	39-42		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30 base.....85 to 87 per cent off list
Carbon 0.30 to 0.40, base.....83 to 85 per cent off list
Plus usual differentials and extra for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2 1/4-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1 1/2-in. O.D. 9 gage	15
2 1/4-in. O.D. 12 gage	17	5 1/2-in. O.D. 9 gage	55
2 1/4-in. O.D. 11 gage	18	5 1/2-in. O.D. 9 gage	57

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Prices of Iron and Steel Products and Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.65
Old range non-Bessemer, 51½ per cent iron	4.90
Mesabi Bessemer, 55 per cent iron	5.40
Mesabi non-Bessemer, 51½ per cent iron	4.75

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	9.00c. to 9.50c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	42c.
Manganese ore, ordinary, 48 per cent manganese from the Caucasus	40c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, high grade, per unit, in 60 per cent concentrates	$8.75 to $9.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f., Atlantic seaboard	18 50 to 24.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	80c.

Coke and Coal

(Per Net Ton)

Furnace coke, f.o.b Connellsville prompt	$3.75 to $4.50
Foundry coke, f.o.b. Connellsville prompt	4.50 to 5.00
Mine run steam coal, f.o.b. W. Pa. mines	1.50 to 2.10
Mine run coking coal, f.o.b. W. Pa. mines	1.90 to 2.10
Mine run gas coal, f.o.b. W. Pa. mines	2.25
Steam slack, f.o.b. W. Pa. mines	1.20 to 1.30
Gas slack, f.o.b W. Pa. mines	1.40 to 1.50

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$105.00 to $110.00
Ferromanganese, foreign, 80 per cent, f.o.b. Atlantic port, duty paid	105.00 to 110.00
Ferrosilicon, 50 per cent, delivered	75.00 to 82.50
Ferrosilicon, 75 per cent	140.00 to 145.00
Ferrotungsten, per lb. contained metal	90c. to 95c.
Ferrochromium, 4 per cent carbon and up, 60 to 70 per cent Cr., per lb. contained Cr. delivered	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated.)

Spiegeleisen, domestic, 19 to 21 per cent.....$33.00 to $35.00
Spiegeleisen, domestic, 16 to 19 per cent..... 32.00 to 34.00
Ferrosilicon, Bessemer, 10 per cent, $39.50; 11 per cent, $42; 12 per cent, $44.50; electric furnace ferrosilicon 10 to 11 per cent, $38, furnace, with an advance of $1 per unit for material above 10 per cent.
Silvery iron, 5 per cent, $27.00; 6 per cent, $28.00; 7 per cent, $29.00; 8 per cent, $29.00 to $30.00; 9 per cent, $32.50; 10 per cent, $34.50; 11 per cent, $37.00; 12 per cent, $39.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton, f.o.b. Illinois and Kentucky mines	$17.50
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	18.00
Fluorspar, foreign, 85 per cent calcium fluoride, not over 5 per cent silica, c.i.f. Philadelphia, duty paid, per gross ton	19.75

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$40.00 to $43.00
Maryland	48.00 to 50.00	43.00 to 45.00
Ohio	43.00 to 46.00	40.00 to 43.00
Kentucky	43.00 to 45.00	40.00 to 43.00
Illinois	43.00 to 45.00	40.00 to 43.00
Missouri	45.00 to 48.00	38.00 to 43.00
Ground fire clay, per ton		6.50 to 7.50
Silica Brick:		
Pennsylvania		40.00
Chicago		49.00
Birmingham		54.00
Silica clay, per ton		8.00 to 9.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		45.00

Bolts and Nuts

Machine bolts, small rolled threads...60 and 10 per cent off list
Machine bolts, all sizes, cut threads
50, 10 and 10 per cent off list
Carriage bolts, smaller and shorter, rolled threads
50, 10 and 10 per cent off list
Carriage bolts, cut threads, all sizes..50 and 10 per cent off list
Eagle carriage bolts.....65 and 10 per cent off list
Lag bolts.....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.
45, 10 and 5 per cent off list
Larger and longer sizes.....45, 10 and 5 per cent off list
Hot-pressed nuts, blank or tapped, square.....4c. off list
Hot-pressed nuts, blank or tapped, hexagons....4.40c. off list
C.p.c. and t. square or hex. nuts, blank or tapped.4.10c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80, 10 and 5 per cent off list
⅞ in. and larger, U. S. S.....75, 10 and 5 per cent off list
Small sizes, S. A. E.....80, 10, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger....75, 10, 10 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80 and 5 and 2½ per cent off list
Tire bolts.....50, 10 and 5 per cent off list
Bolt ends with hot pressed nuts..50, 10 and 10 per cent off list
Bolt ends with cold pressed nuts...45, 10 and 5 per cent off list
Washers .....6c. to 6.25c. off list
Lock washers .....80 per cent off list

The foregoing are delivered prices for 1000 lb. or over, except on stove and tire bolts on which a full freight allowance is made on 300 lb. or over, for shipment within established zone limits, buyers outside of the zone paying the additional freight. Washers and lock washers are quoted f.o.b. Chicago and Pittsburgh.

Semi-Finished Castellated and Slotted Nuts

(Prices delivered within specified territories)
(To jobbers and consumers in large quantities)

	Per 100 Net S. A. E.	Per 100 Net U. S. S.		Per 100 Net S. A. E.	Per 100 Net U. S. S.
¼-in.	$0.44	$0.44	¾-in.	$2.35	$2.40
5/16-in.	.515	.515	⅞-in.	3.60	3.60
⅜-in.	.62	.66	1 in.	5.55	5.80
7/16-in.	.79	.90	1¼ in.	8.90	8.90
½-in.	1.01	1.05	1½ in.	12.60	13.10
9/16-in.	1.38	1.42	1¾ in.	18.35	18.35
⅝-in.	1.70	1.73	1½ in.	21.00	21.00

Larger sizes—Prices on application.

Cap and Set Screws

(Freight allowed within zone limits)

Milled cap screws.....80, 10 and 10 per cent off list
Milled standard set screws, case hardened
80, 10 and 10 per cent off list
Milled headless set screws, cut thread
80, 10 and 10 per cent off list
Upset hex. head cap screws, U. S. S. thread
80, 10, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread
80, 10, 10 and 10 per cent off list
Milled studs .....75 and 10 per cent off list

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$36.00 to $38.00
Forging billets, ordinary carbons	42.50
Sheet bars, Bessemer	37.00 to 40.00
Sheet bars, open hearth	37.00 to 40.00
Slabs	36.00 to 38.00
*Wire rods, common soft, base, No. 5 to ⅝-in.	43.00
Wire rods, common soft, coarser than ⅝-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2c.
Skelp, sheared, per lb.	2c.
Skelp, universal, per lb.	2c.

*Chicago mill base is $50. Cleveland mill base, $48.

Alloy Steel

(F.o.b. Pittsburgh or mill)

S. A. E. Series Numbers	Bars 100 lb.
2100*(1¼% Nickel, 10 to 20 per cent Carbon)	$3.00 to $3.25
2300 (3½% Nickel)	4.75
2500 (5% Nickel)	$6.25 to 6.50
3100 (Nickel Chromium)	3.65
3200 (Nickel Chromium)	5.50
3300 (Nickel Chromium)	7.50 to 7.75
3400 (Nickel Chromium)	6.50 to 6.75
5100 (Chromium Steel)	3.50
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.25
6100 (Chromium Vanadium spring steel)	4.25
9250 (Silicon Manganese spring steel)	3.50
Carbon Vanadium (0.45 to 0.55 Carbon, 0.15 Vanadium)	4c.
Nickel Chrome Vanadium (0.60 Nickel, 0.60 Chromium, 0.15 Vanadium)	4.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.25
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	3.75
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.20—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10-in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4-in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates from Valley and Western Pennsylvania Furnaces to Consuming Points

Freight rates on pig iron from Valley furnaces and from those located in western Pennsylvania to destinations which these furnaces conveniently reach are presented this week in the continuance of the publication by THE IRON AGE *of freight rates on iron and steel. The points given are within the so-called Pittsburgh district. The rates are per gross ton*

To	From Valley Furnaces	Johnstown, Pa.	Josephine, Pa.	Scottdale and Dunbar, Pa.
Ambridge, Pa.	$1.76	$1.76	$1.39	$1.89
Avonmore, Pa.	1.76	1.39	1.13	1.76
Brackenridge, Pa.	1.76	1.76	1.13	1.76
Braddock, Pa.	1.76	1.76	1.26	1.64
Butler, Pa.	1.76	1.76	1.39	1.76
East Pittsburgh, Pa.	1.76	1.76	1.26	1.39
Etna, Pa.	1.76	1.76	1.39	1.64
Glassmere, Pa.	1.76	1.76	1.39	1.64
Glassport, Pa.	1.76	1.64	1.64	...
Greensburg, Pa.	1.76	1.64	1.01	0.88
Homestead, Pa.	1.76	1.76	1.39	1.64
Hyde Park, Pa.	1.76	1.39	1.13	1.26
Kittanning, Pa.	1.76	1.76	1.64	2.02
McKeesport, Pa.	1.76	1.76	1.39	1.64
McKees Rocks, Pa.	1.76	1.76	1.64	1.64
Monongahela, Pa.	1.76	1.76	1.76	1.64
Monessen, Pa.	1.76	1.76	1.76	...
New Kensington, Pa.	1.76	1.76	1.39	1.76
Oakmont, Pa.	1.76	1.76	1.39	1.76
Penn Station, Pa.	1.76	1.64	1.26	1.26
Pittsburgh	1.76	1.76	1.39	1.64
Sharpsburg, Pa.	1.76	1.76	1.39	...
Swissvale, Pa.	1.76	1.76	1.26	1.64
Tarentum, Pa.	1.76	1.76	1.39	1.76
Trafford, Pa.	1.76	1.76	1.26	1.39
Vandergrift, Pa.	1.76	1.39	1.13	1.76
Verona, Pa.	1.76	1.76	1.39	1.76
Wilmerding, Pa.	1.76	1.76	1.26	1.39

STRONG ALUMINUM ALLOYS

Recent Developments in Making High-Tensile Products—New Alloys Easy to Fabricate

Some of the recent developments in the production of aluminum alloys having a high tensile strength, machinability and other qualities desired in commercial aluminum alloys were discussed by R. S. Archer, metallurgist of the research bureau of the Aluminum Co. of America, Cleveland, in an interesting and comprehensive talk on strong alloys of aluminum and the heat treating of aluminum alloys before the Cleveland section of the American Society for Steel Treating, Dec. 19. He predicted that it will not be very long before nearly every heat treating plant will be called upon to heat treat aluminum alloys. It is possible to secure by heat treating, he said, changes in the physical properties of aluminum comparable to the changes brought about by heat treating steel. Pure aluminum has a Brinell hardness of 15 and commercial aluminum a hardness of 25, but alloys can be introduced to produce a useful aluminum alloy with a Brinell hardness of 160.

Mr. Archer spoke of the development of duralumin, which was at first a trade name, but has come to be used to designate a strong aluminum alloy of the type in which copper and manganese are the usual alloys introduced and which has been produced with a tensile strength of 60,000 lb. per sq. in. Probably the chief factor that has prevented the more general use of duralumin is the difficulty to fabricate it in the form in which it is made. His company felt that if an alloy could be produced at a lower cost than duralumin and one that would be easier to fabricate, it would be more generally used.

Two New Alloys

The Aluminum company has succeeded, he said, in producing two alloys that are easier to fabricate and have physical properties similar to duralumin. One is an aluminum-copper alloy and the other an aluminum-magnesium-silicon alloy. The former has a tensile strength of 20,000 lb. per sq. in. which by heating to 980 deg. Fahr. and by quenching in water is increased to 38,000 lb. per sq. in., with an elongation of 30 per cent in 2 in. It was discovered that, by another heat treatment at 300 degree, a tensile strength of 50,000 lb. per sq. in. was secured and the elongation was reduced to 20 per cent. Equally successful results were obtained with the other alloy in increasing by heat treating the tensile strength, elastic limit, hardness and machinability. The speaker said that by the improvements in the metal and mechanical processes the market price of aluminum alloy has been reduced to 45c. or 50c. per lb. and is now cheaper than brass, piece for piece, the higher cost of aluminum being offset by its lighter weight, which is one-third that of brass.

Heat Treatment of Aluminum Alloys

Mr. Archer discussed at considerable length the heat-treating processes for aluminum alloys, which include annealing at temperatures from 570 to 660 deg., a solution heat treatment at 900 to 1000 deg. and a second hardening at 200 to 350 deg., depending on the alloy, although some alloys do not require the latter, being aged at room temperature. Close temperature control is required in proper heat treating. The electric furnace with automatic control or fused salt baths can be used for the solution heat treatment. Water is usually used for quenching, although oil can be used. Live steam is used for the precipitation heat treatment or the second hardening for ordinary work, and an air furnace for highly finished material. By cold rolling after heat treating, aluminum sheets can be made with a tensile strength of 80,000 lb. per sq. in. No matter how hard aluminum is, it will not resist abrasion by steel, so that care is required in handling. With aluminum the same rigidity is secured with less weight than with steel.

Mr. Archer pointed out that aluminum in its wrought condition can be made in various forms such as sheets, bars, seamless tubing and forgings, but has size limitations. In discussing the various applications for aluminum alloys he exhibited a number of samples of automobile forgings, including connecting rods which he said are the most interesting examples from the strength standpoint. One exhibit was an aluminum axle for an automobile. He said that the largest forging his company is making is an aeroplane propeller which is made from an 180-lb. billet or equivalent to a 500-lb. steel billet, but he understood that the Navy Department, which is doing a great deal in "aluminumizing" its warships, is using aluminum billets up to 800 lb. Larger forgings which are now being generally made, he said, can be produced for Diesel engines and for locomotive forgings. Exhibits included aluminum sheets spot welded. This has been difficult to work out, but he thought that the problem of spot welding aluminum has been solved.

For Contents of This Issue See Orange Insert

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
Dec.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
17.....	14.75	14.37½	55.75	10.00	9.62½	7.80	7.45
18.....	14.75	14.37½	55.62½	10.00	9.62½	7.77½	7.42½
19.....	14.75	14.37½	56.37½	10.00	9.62½	7.85	7.50
20.....	14.75	14.37½	....	10.00	9.62½	7.85	7.50
22.....	14.87½	14.50	57.25	10.00	9.62½	7.92½	7.57½

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Dec. 22.

Strength continues to pervade all the markets. Copper is higher on a good volume of business. Tin prices have advanced in a moderately active market. Lead continues scarce and prices are nominally higher. After a slight reaction zinc has gone to the highest values of the year.

Copper.—The volume of business continues large and the advance in values is orderly. It is estimated that recent purchases have totaled at least 40,000,000 lb. per week, with close to 60,000,000 purchased in the last week or 10 days. While many consumers are fairly well covered for the first quarter, the order books of mills are understood to have improved so that further buying will be necessary. The market is regarded as firm today at 14.75c., delivered, with all metal formerly available under this level disposed of. Most of the buying referred to has been for domestic consumption, but there is still a good foreign demand. Lake copper is quoted at 14.75c. to 14.87½c., delivered.

Tin.—While the market has been dull on the surface, fairly liberal sales have been made on one or two days. This was true on Dec. 17 and 18, when good buying appeared late in the day. The total for the week ended with Dec. 19 was about 1000 tons, of which consumers bought close to two-thirds. All reports seem to agree that consumers are pretty well covered for December and January and possibly February, but that they have a good deal to buy for February and at least March. They are not, however, eager buyers. There is plenty of tin in sight, shipments are large and there is no shortage at present. At the end of last week the report was current that the much talked of government stocks at Malay have now been liquidated. This has resulted in a sharp rise in the London and New York markets today because it indicates a stronger statistical position and the elimination of the invisible supply. Prices in London today were about £4 per ton higher than on Tuesday, Dec. 16, with spot standard quoted at £265 10s., future standard at £268 10s. and spot Straits at £268 10s. The Singapore price today was £272, an advance of £7 per ton on Saturday, due to the Malay report. Arrivals thus far this month have been 2705 tons, with 7995 tons afloat. Spot Straits tin was quoted today at 57.25c., New York.

Lead.—Very little lead is available and transactions are limited to small quantities. Prices vary widely in their range and are largely nominal. The leading interest again changed its contract price $2 per ton, to 9.35c., New York, on Dec. 18. The small volume of business being done is mostly in the outside market at an equivalent of 10c., New York, or 9.10c. to 9.80c., St. Louis. These are the highest prices this year.

Zinc.—Prime Western zinc has reached a new high price for the year at today's quotation of 7.57½c. to 7.60c., St. Louis, or 7.92½c. to 7.95c., New York. After reaching 7.55c., St. Louis, a week ago there was a slight reaction due largely to lower prices in London. That market has again advanced sharply, which, together with a fair demand and other favorable conditions, accounts for the present strength.

Nickel.—Quotations for wholesale lots of shot and ingot nickel are unchanged at 29c. to 30c. per lb., with electrolytic nickel at 33c.

Antimony.—Chinese metal is quoted at 14c. to 14.12½c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c., delivered.

Old Metals.—The week shows a continued advance all along the line. Dealers' selling prices are as follows in cents per lb.:

Copper, heavy and crucible	14.00
Copper, heavy and wire	13.25
Copper, light and bottoms	11.75
Heavy machine composition	10.75
Brass, heavy	9.25
Brass, light	7.75
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	9.25
Lead, heavy	8.75
Lead, tea	7.75
Zinc	4.50
Cast aluminum	17.50
Sheet aluminum	17.50

Chicago

Dec. 22.—Copper, lead and zinc have again advanced on a generally strong market. Prices of all the metals are stiff, although buying is less active than during the past two weeks. Among the old metals only lead pipe has advanced. We quote, in carload lots: Lake copper, 14.75c.; tin, 56.50c.; lead, 10.25c.; spelter, 7.75c.; in less than carload lots, antimony, 16c. On old metals we quote copper wire, crucible shapes and copper clips, 12c.; copper bottoms, 10c.; red brass, 9.25c.; yellow brass, 8c.; lead pipe, 8c.; zinc, 4.87½c.; pewter, No. 1, 26c.; tin foil, 36c.; block tin, 43c.; all buying prices for less than carload lots.

British Iron and Steel Exports and Imports

WASHINGTON, Dec. 20.—Exports of iron and steel from Great Britain in November amounted to 311,630 gross tons, compared with 309,205 tons in October, according to a cablegram received by the Department of Commerce from Commercial Attaché Butler, London. For the 11 months ended with November, exports aggregated 3,549,997 tons. Imports in November were 213,002 tons, a decline of 28,000 tons from October. For the 11 months imports totaled 2,207,989 tons. Imports and exports in detail for October and November follow:

British Foreign Trade in Iron and Steel in 1924

	Imports		Exports	
	October	November	October	November
Pig iron and ferroalloys	33,356	30,296	53,960	46,960
Ingots, blooms, billets and slabs	110,743	101,954	502	939
Iron bars, rods and angles	22,387	18,276	2,844	3,661
Steel bars, rods and angles	23,813	21,157	20,813	21,937
Structural steel	7,177	5,173	6,210	4,010
Hoops and strips	5,923	3,226	7,305	5,580
Plates and sheets	15,788	12,721	31,713	27,472
Galvanized sheets	.....	.....	55,034	54,301
Tin plate	.....	.....	45,776	41,811
Cast tubes, pipes and fittings	1,217	1,688	6,679	6,888
Wrought tubes, pipes and fittings	2,902	3,086	12,581	19,353
Rails	1,967	1,293	12,406	12,271
Other railroad material	807	597	15,383	13,740
Wire	4,654	3,773	7,140	6,656
Wire cables and rope	.....	.....	2,202	2,323
Wire nails, including staples	4,355	4,572	324	171
Wire manufactures, not elsewhere specified	437	425	1,950	1,422
Nails, tacks, rivets and washers	722	475	1,396	1,487
Bolts and nuts, including screws for metals	603	697	2,770	3,496
Iron and steel castings	809	497	207	178
Iron and steel forgings	850	494	83	59

Production of pig iron reached 583,500 tons in November, compared with 586,400 tons for October; that of steel ingots and castings totaled 672,800 tons, against 678,500 tons in the previous month. At the close of November there were 173 blast furnaces and 298 open-hearth furnaces in operation, while at the end of the previous month there were respectively 171 and 292 operating.

PERSONAL

J. Louis Reiber has succeeded John McElwain, who has resigned as vice-president of W. J. Rainey, Inc., New York. Mr. Reiber was connected with the sales department of the Carnegie Steel Co., Pittsburgh, for about 13 years, and for the past five years has been sales manager of the Rainey-Wood Coke Co., which position he will retain as well as vice-president in charge of sales of the W. J. Rainey company.

Francis Y. Casey, who for the past five years has been assistant manager of sales, has been appointed sales manager of W. J. Rainey, Inc.

K. L. Clark has been appointed western representative of the tool steel department of Henry Disston & Sons, Inc., Philadelphia. His headquarters will be at Washington Boulevard and Jefferson Street, Chicago. Prior to affiliating with the Disston organization, Mr. Clark was with the Firth Sterling Steel Co. and the Latrobe Electric Steel Co. in the sale of tool steel in Detroit and Chicago.

J. G. Worker, assistant to the president, American Engineering Co., Philadelphia, was the speaker at the bi-monthly meeting of the steel works section, Engineers Society of Western Pennsylvania at the William Penn Hotel, Pittsburgh, Thursday evening, Dec. 18. His subject was "How to Obtain Higher Thermal Results in Boiler Room and the Relation between Efficiency and Economic Values."

H. R. Beegle, who has resigned as general manager of the Beaver Clay Mfg. Co., New Galilee, Pa., is succeeded by E. M. Long, who for several years has been identified with the McLain Fire Brick Co., Pittsburgh.

W. E. Skelton, manager of the Skelton Shovel Works Co., Dunkirk, N. Y., has been appointed manager of the Canadian Shovel & Tool Co., Hamilton, Ont., effective Jan. 1. Archibald Milligan, superintendent at the Canadian plant, will succeed Mr. Skelton at Dunkirk.

Dr. Herbert Schmeidler, director and works manager of the Kammerich Werke, A. G., of Berlin, sailed for Germany on Dec. 18, after a two weeks' business trip in this country. The Kammerich company is a large manufacturer of seamless cold drawn tubing and pressed steel products.

Uri T. Hungerford, chairman of directors and founder of the U. T. Hungerford Brass & Copper Co., New York, celebrated his eighty-third birthday on Dec. 14. In honor of this event stockholders and a few invited guests gave a luncheon to Mr. Hungerford on Dec. 18 at the Hardware Club, New York.

Thomas C. McBride, Philadelphia manager of the Worthington Pump & Machinery Corporation, has been awarded the Edward Longstreth medal of Franklin Institute in recognition of his invention of the Worthington locomotive feed-water heater. Mr. McBride is a graduate of the University of Pennsylvania, with the degree of M. E. He spent a year and a half in the drafting department of the Baldwin Locomotive Works, then in 1896 he became Philadelphia sales agent for the Snow Steam Pump Co. After the merger of this company with the Worthington Corporation he continued as Philadelphia manager for the corporation.

Albert L. Marks, president Albert L. Marks & Co., iron and steel scrap dealer, Chicago, will leave for the West some time in January to recuperate. On his return he will again be active in the iron and steel business.

F. M. McCall, purchasing agent for the United Iron Works, Kansas City, Mo., has been elected president of the Kansas City Purchasing Agents Association.

Oswald F. Schuette, formerly Washington correspondent of THE IRON AGE, and widely known as a writer on business and politics, has joined the Conover-Mooney Co., a Chicago advertising agency, as vice-president.

O. M. Bostwick, New York representative of the publicity department, General Electric Co., and formerly advertising manager of the Sprague Electric Works, has tendered his resignation, to take effect Jan. 1. After a short vacation Mr. Bostwick will resume activities in the technical publicity field in New York.

L. D. Huestis, who has been superintendent of coke ovens at Portsmouth, Ohio, for the past four years, was elected general manager of the Portsmouth By-Product Coke Co., Columbus, Ohio, at the directors' meeting on Dec. 5. J. L. Watkins, formerly auditor, was elected treasurer, succeeding C. E. Lewars, resigned, and C. W. Barton, formerly chief clerk, succeeds Mr. Lewars as secretary.

Holidays Affect Mill Operations in the Mahoning Valley

YOUNGSTOWN, Dec. 20.—Some irregularity marked the operation this week of Mahoning Valley iron and steel properties, owing to the Christmas holiday observance. Schedules announced at the beginning of the week indicated that rolling mill departments would be maintained in full, or at levels previously held, until Wednesday, when they would be suspended.

Considerable variation marked the announcement of resumptions. For the most part sheet mill producers planned to remain inactive for the remainder of the week, although several companies planned to resume again Friday.

Departments requiring continuous operation, such as blast furnaces, steel plants and by-product coke ovens, are unaffected.

Due to pressure for deliveries, the lull in production this year by Valley mills is much less pronounced than usual.

Sheet makers started the week with 93 mills active, of 127, as compared with 107 under power the preceding week. The Thomas Sheet Steel Co. has 10 of its 12 mills at Niles in action.

Of 45 blast furnaces in the Youngstown district, embracing the Mahoning and Shenango Valleys, 27 are pouring, the latest to resume being No. 1 stack at Farrell, Pa., of the Carnegie Steel Co. The Carnegie company also plans to start one of its blast furnaces at New Castle, Pa., at an early date. The Sheet & Tube company will probably start one or two more blast furnaces in the district at an early date.

Expansion of A. M. Castle & Co. on Pacific Coast

The purchase by A. M. Castle & Co., Chicago, of the firm of Little & Robertson, Inc., Los Angeles, Cal., largest independent distributor of finished iron and steel products in Southern California, was announced in THE IRON AGE of Dec. 18. This latest acquisition of the Castle company rounds out a program of expansion which now embraces the entire Pacific Coast. The company entered the Coast field five years ago when it purchased the Western Hardware & Metals Co., Seattle, Wash. In September of this year, it bought the Berger & Carter Co., San Francisco, where it now contemplates purchasing a ten-acre site for a new plant to cost $500,000. This will be done within a year and a half, when the lease on the present plant expires. Through its purchases and its contemplated improvements to both the San Francisco and Los Angeles plants, the company will spend in the immediate future at least $2,000,000.

The Castle company is incorporated for $2,000,000, but its assets are greatly in excess of its capitalization, and the Western venture is being financed solely through earnings and not through any special financing. Louis M. Henoch, treasurer of the company, will assume direct supervision of the Pacific Coast plants.

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OBITUARY

James T. McCleary

James T. McCleary, well known to the iron and steel trades for his successful administration of the affairs of the American Iron and Steel Institute for a number of years, died at La Crosse, Wis., Wednesday, Dec. 17. Mr. McCleary was born in Ingersoll, Ontario, Canada, Feb. 5, 1853, and was educated in the public schools of Ingersoll and at McGill University, Montreal. After teaching school in Wisconsin, he became professor of history and civics at the State Normal School at Mankato, Minn., continuing in this position 11 years. In 1892 he was elected to Congress from the second Minnesota district and served continuously for 14 years (1893-1907). In the McKinley-Bryan campaign of 1896, he rendered conspicuous service to the cause of the gold standard, and one of his speeches had a circulation of millions of copies. In March, 1907, he was appointed Assistant Postmaster General by President Roosevelt. He was elected secretary of the American Iron and Steel Institute Jan. 11, 1911, and continued in that position until May, 1920, when he resigned on account of ill health. He then turned his attention to the writing of a book on the tariff and the volume, "Protection Our Proper Permanent Policy," was published in 1921 by the National Tariff Institute, Inc., of Washington and St. Paul, of which Mr. McCleary was president. In reviewing the book in its issue of July 28, 1921, THE IRON AGE said:

JAMES T. McCLEARY

"Mr. McCleary is a protectionist, there is no doubt about that—a protectionist of the school of James M. Swank and 'Pig Iron' Kelley. Not many of that type are to be found. Mr. McCleary's view is that protective tariff rates cannot be too high.

"The book is a consistent preachment of Simonpure protection, unmodified by any of the latter-day developments in our foreign trade. It illustrates how far apart men can be on this matter of the proper fiscal and impost policy of the American Government, yet with each side confident that its view will insure the largest prosperity to the largest number."

Mr. McCleary was of the highest personal character. He brought to the discussion of national questions an unusual candor, clearness and teaching power. His method was that of an honest instructor who, in arguing a proposition, seeks, without any of the mere fencing of a contender, to lodge his thoughts in the minds of his readers or his hearers in just the way in which they were formed in his own mind. The art of doing this is rare and Mr. McCleary was indeed a rare man in many ways. He was always intensely in earnest, but his kindly disposition never failed. His influence was for the best things.

HERBERT F. GILLINGHAM, a veteran of the warehouse trade in Philadelphia, connected for over 50 years with H. F. Gillingham & Co., Philadelphia, died Oct. 8 at the age of 69 years. The business of H. F. Gillingham & Co. was established by Mr. Gillingham's grandfather in 1841 and was succeeded to by his father. He was at one time president of the American Iron, Steel and Heavy Hardware Association at Philadelphia.

DUDLEY R. KENNEDY, 38, in charge of the industrial relations department at Troy, N. Y., of the Cluett-Peabody Co., died suddenly Dec. 19 from angina pectoris. Mr. Kennedy was the son of J. B. Kennedy of Youngstown, formerly chairman of the board of directors of the Brier Hill Steel Co. He had served as assistant to President James A. Campbell of the Youngstown Sheet & Tube Co., having charge of industrial relations work, and had been identified with the B. F. Goodrich Co., Akron, in a similar capacity. During the war, he was in charge of the industrial relations department established in connection with the Hog Island shipbuilding yards, near Philadelphia. Later he established offices in New York and Philadelphia as industrial relations consultant. Funeral services were conducted Dec. 22 from the residence of his father at Poland, near Youngstown, Ohio.

CHARLES NORTON NICHOLLS, president Illinois Rolling Mill Co., Joliet, Ill., died Dec. 5.

WILLIAM SHAW WHITE, who died in Pawtucket, R. I., recently, became connected with the J. S. White Co., iron founders, immediately after graduation from Brown University in 1886. Two years later he joined Tufts College Divinity School and, after serving in the ministry in Cleveland and Foxboro, Mass., he returned to Pawtucket in 1899, giving up his profession to carry on his father's business. The foundry was started as the partnership of White, Jenks & Sayles, but Mr. White, grandfather of the deceased, later bought out the partners and the business has been in the family since. It is now managed by John R. White, great-grandson of the founder. William S. White was prominent in the foundry trade of New England and attended every convention of the American Founders Association since 1902, including those at London and Paris last year. While at Foxboro he was elected to the House of Representatives of Massachusetts and during his term there rendered valuable service on the House Committee on Labor. He was in his sixty-second year.

WALTER F. BALLINGER, head of the Ballinger Co., engineer, 100 East Forty-second Street, New York, died on Sunday morning, Dec. 21, from a fractured skull, sustained in an automobile accident in Philadelphia. Mr. Ballinger was 75 years old. He had planned and aided in superintending the construction of many large modern buildings in various cities. His residence was at 124 Chestnut Hill Avenue, Philadelphia.

Weirton Steel Co.'s Tin Plate Works at Steubenville to Resume

The Weirton Steel Co., Steubenville, Ohio, tin plate works will resume operations in full Jan. 5. The plant will be improved in a great many of its departments, the main feature being the substitution of electric for steam power. The power will be supplied from the Weirton, W. Va., works and carried to Steubenville works over a power line. A number of other improvements will be made for the purpose of putting this plant on a basis of economical operation similar to that at the Weirton and Clarksburg Works. With the starting up of the Steubenville works, E. M. Mentzer, who has been manager of the Weirton tin plate department, becomes general superintendent in charge of all tin mill operations. H. G. Richards succeeds Mr. Mentzer as manager of the Weirton tin plate department, and E. E. Paddock has been appointed manager of the Steubenville Works. A. J. McFarland, who recently resigned as general manager, Steubenville Works, Wheeling Steel Corporation, has been appointed general manager, Follansbee, W. Va., plant of the Follansbee Bros. Co., Pittsburgh, and in addition to his duties at that plant, will act in an advisory capacity in the operating affairs of the Follansbee company. Before becoming general manager of the Steubenville works of the Wheeling Steel Corporation about three years ago, Mr. McFarland had been for several years in charge of the company's plant at Portsmouth, Ohio.

FABRICATED STEEL RECORD

Week's Total of Bookings Drops But Marked Rise in Inquiries

Awards of fabricated structural steel work covered 12,500 tons in the larger size jobs, as listed below, less than one-half of the previous week's bookings, but new projects now under consideration call for nearly 59,000 tons, or much more than any week for many months.

Apartment house, West End Avenue, New York, for Bing & Bing, 800 tons, to American Bridge Co.

Long Island Railroad, bridge, 250 tons, to McClintic-Marshall Co.

Pennsylvania Railroad, transfer bridge, 150 tons, to McClintic-Marshall Co.

Norfolk & Western Railroad, transmission towers, 500 tons, to Blaw-Knox Co.

Pennsylvania Railroad, bridge in Indiana, 300 tons, and bridge in Illinois, 100 tons, to Bethlehem Steel Co.

Central Railroad of New Jersey, highway bridge at Perth Amboy, N. J., 250 tons, to McClintic-Marshall Co.

Fort Mills, S. C., flood gates, 800 tons, to Newport News Shipbuilding & Dry Dock Co.

Turbine foundations, Hell Gate, New York, power station, 300 tons, to American Bridge Co.

Southern Railway, bridge in Virginia, 250 tons, to American Bridge Co.

Pennsylvania Railroad, bridge in Indiana, 250 tons, to American Bridge Co.

Akron Enterprise Co., Akron, Ohio, theater and office building, 500 tons, to Burger Iron Works.

Louisville Bridge & Iron Co., 300 tons, will fabricate in own shops.

Tutweiler Hotel addition, Birmingham, 400 tons, to Ingalls Iron Works.

Columbia Power Co., Cincinnati, addition to plant at Miami Fort, 550 tons, to Fort Pitt Bridge Works.

Hubbard Steel Foundry Co., South Chicago, addition, 250 tons, to Worden-Allen Co.

Ruberoid Co., Joliet, Ill., crane runway, 150 tons, to Worden-Allen Co.

Apartment house, Sacramento and Mason Streets, San Francisco, 800 tons, to Central Iron Works.

Southern California Telephone Co., Los Angeles, Prospect Exchange, 400 tons, to Llewellyn Iron Works.

Building, Seventh and Main Streets, Los Angeles, 1500 tons, to Baker Iron Works.

Mack Truck Co., warehouse, Los Angeles, 200 tons, to Union Iron Works.

Fairyland Theater, Long Beach, Cal., 200 tons, to Union Iron Works.

Bard's Alexandria Theater, Pasadena, Cal., 150 tons, to Union Iron Works.

Toberman Theater, Hollywood, Cal., 600 tons, to Baker Iron Works.

San Diego Electric Railroad, San Diego, three overhead bridges, 175 tons, to Llewellyn Iron Works.

Martz Building, Seventh Street, Los Angeles, 350 tons, to Llewellyn Iron Works.

Pacific National Bank building, Los Angeles, 1525 tons, to Union Iron Works.

Swift & Co., Chicago, section No. 3, tractor runway system, 214 tons, to Vanderkloot Steel Co.

Iowa State Teachers' College, Cedar Falls, Iowa, 200 tons, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

New York Academy of Medicine, Fifth Avenue, New York, 1200 tons.

Elmira, N. Y., theater, 400 tons.

Imperial Sugar Co., Sugarland, Tex., 900 tons.

Warehouse, Madison Avenue, New York, 6000 tons.

Keeler Hotel, Albany, N. Y., 2600 tons.

Toledo-Edison Co., Toledo, Ohio, boiler house extension, 800 tons.

Philadelphia & Reading Railroad, bridge at Schuylkill Haven, Pa., 300 tons.

Public Service Corporation, Harrison, N. J., boiler house, 250 tons.

Lackawanna Railroad, car repair shop, Buffalo, 400 tons.

Scranton Times, Scranton, Pa., 400 tons.

Glen Olden, Pa., power house, 1300 tons; bids in but no decision.

Baltimore & Ohio Railroad, four bridges, 1500 tons, no decision.

Bank in Utica, N. Y., 1200 tons.

Philadelphia-Camden bridge, Camden approach, 1400 tons; O'Neil Construction Co., general contract.

Grandstand, North Randall, Ohio, 300 tons, bids taken.

Wabash Portland Cement Co., Detroit, plant at Osborn, Ohio, 1500 tons, bids taken.

Seneca vocational electric school, Buffalo, 150 tons.

Louisville & Nashville Railroad, bridge work, 1200 tons, bids in Dec. 27.

Huntington National Bank building, Columbus, Ohio, addition, 1400 tons, bids being taken.

Central of Georgia Railway, bridge work, 500 tons, bids in.

Apartment house, Louisville, 2000 tons, tentative bids being taken.

Starks Building, Louisville, addition, reported last week as 2000 tons, will require approximately 3000 tons.

American Falls dam, American Falls, Idaho, 500 tons.

Elks' Club, Santa Barbara, Cal., 150 tons.

Southern California Athletic Club, Los Angeles, 5000 tons.

Berkeley, Cal., theater, 105 tons.

Golden State Theater, Irving Street near Fifteenth, San Francisco, tonnage not stated.

United States National Bank, Omaha, Neb., addition, 200 tons.

Stevens Hotel, Chicago, 17,000 tons, bids to be asked in January.

Textile Exchange, Chicago, estimated at 9000 tons; Joseph G. Ludgin, architect; figures not yet asked.

RAILROAD EQUIPMENT BUYING

Locomotive Inquiries and Orders Exceed Previous Week But Car Business Is Light

While car orders dropped to a total of 200 and inquiries for cars also registered a considerable decline from the previous week, totaling only 825, locomotive purchases of 57 and inquiries for 29 both exceeded the previous week's totals. The largest locomotive order was that of the Philadelphia & Reading, which placed 30 with the Baldwin Locomotive Works. The foremost locomotive inquiry came from the Missouri, Kansas & Texas for 14. Some of the items are the following:

The Mississippi Central Railroad is in the market for 100 flat cars.

Guggenheim Brothers, New York, are inquiring for 140 ore, 30 trailers and 30 flat cars for export, and 9 locomotives.

The Central Railroad of New Jersey has purchased 10 Mikado type locomotives from the Baldwin Locomotive Works.

The Philadelphia & Reading has closed on 30 locomotives with the Baldwin Locomotive Works.

The New York Central has purchased 7 electric switching locomotives and 2 electric freight locomotives from the General Electric Co.

The Pittsburgh & Lake Erie has awarded 10 locomotive tenders to the Lima Locomotive Works.

The United States Food Products Car Line Corporation, New York, has purchased 50 tank cars from the American Car & Foundry Co.

The Waite Phillips Co. has closed on 100 tank cars with the General American Tank Car Corporation.

The Chicago, Rock Island & Pacific has contracted for repairs on 750 refrigerator cars with the Pressed Steel Car Co.

The Central of Georgia has purchased 6 passenger cars from the Pullman Car & Mfg. Corporation.

The Baltimore & Ohio has closed on 5 dining cars with the Pullman Car & Mfg. Corporation.

The Southern Railway has ordered 7 baggage-express cars from the Pullman Car & Mfg. Corporation.

The Louisville & Nashville has placed 8 additional Mikado type locomotives with the American Locomotive Co. and has ordered 8 coaches and 2 dining car shells from the American Car & Foundry Co. and 4 baggage and 8 baggage and mail cars from the Pressed Steel Car Co.

The Ford Motor Co. is inquiring for 475 50-ton gondola cars and 50 50-ton flat cars.

The Wabash has placed 400 gondola car repairs with the Streeter Car Co.

The Missouri, Kansas & Texas is inquiring for 14 locomotives.

The Chicago & Western Indiana is in the market for 5 8-wheel switch engines.

The Union Pacific is inquiring for one 3-cylinder 4-10-2 type locomotive.

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Steels by American Railroads

(*Continued from page* 1687)

and the treatment can be given in any properly designed annealing furnace.

Last, but by no means least, we come to the annealed carbon steel forgings. These still make up the majority of locomotive forgings and are to be preferred unless special conditions make extra strength necessary. They are simply made, and their handling in repair work is simple. The possibility of using annealed carbon steel should be thoroughly studied before any of the more expensive grades of forgings are adopted.

In all forgings it is essential to start with a clean, well made steel. Unless the steel maker does his part, the forging maker will labor in vain. If the steel is poorly made, or if the ingots have been rolled before complete solidification, no amount of forging work or heat treatment will serve to produce a good forging.

The Properties of Steels

Tensile Tests and Changes in Temperatures—Influence of Fundamental Properties on Steel Rails

BY JAMES E. HOWARD

IN applying a straining force to a piece of steel the first feature which comes to notice is its elastic extension or compression; that is, its modulus of elasticity, the normal value for which, in round numbers, is 30,000,000 lb. per sq. in. So persistent is this value, under ordinary conditions, that a measure of the deformation under tension or compression is equivalent to a measure of the load which caused it. The utility of strain gage measurements depends upon this principle.

Tensile Tests and Properties

In a carefully conducted tensile test a concomitant change in lateral dimensions will be noted, a relation which is expressed by Poisson's ratio, commonly taken at one-fourth the direct strain. The speaker's determination of this value was 1 over 3.55.

Loads above the elastic limit cause permanent sets which increase as the tensile strength of the steel is approached. Some steels display a jog in the stress-strain curve soon after rapid extension sets in, a period within which the steel stretches under a diminished load. An unstable state of the steel is manifested at this period. At higher temperatures similar periods of relaxation and rigidity alternately follow each other.

The phenomenon of contraction of area is next noted, then tensile strength. As the ultimate strength is approached local contraction of area sets in. The gross load falls but the unit stress on the reduced section continues to rise until actual separation of the metal occurs.

The values of elastic limit, elongation, contraction of area and tensile strength are not fixed in any grade of steel. They are one thing at one temperature and another thing at another temperature, and all are subject to profound modifications by means of heat or mechanical treatment. Tensile strength reduces to zero value at high temperatures when plastic resistance only prevails. As the results of mechanical treatment tensile strength attains a maximum value in hard drawn music wire, the maximum value being more than 460,000 lb. per sq. in.

Effect of Changes in Temperature

The elastic limits of steel are also subject to variations with changes of temperature. As nearly as can be judged elastic limit steadily decreases with rise of temperature. Its greatest divergence from tensile strength appears to be when at a blue heat. It is believed to coincide with tensile strength at liquid air temperature, its maximum value, and again coincide with tensile strength when each are reduced to zero values at plastic temperatures.

Elongation and contraction of area necessarily reduce to zero value at low temperatures when tensile strength and elastic limit coincide. At high temperatures steel draws down almost to a point, a value of over 98 per cent contraction of area having been recorded. A sag in the curve shows diminished contraction of area in the region of 400 to 600 degrees F. This circumstance is probably responsible for the impression which has prevailed that steel is brittle at a blue heat.

The values just described are those which steels display in tensile tests, when the resistance to elongation is confined to the metal itself. Rolling, swaging and wire drawing operations yield different results when done either hot or cold. Other modifications and features remain to be described. In hot finished steel bars an equality in elastic limits commonly exists. That is, the elastic limits in tension and compression have substantially the same value. Overstraining the steel in one direction impairs the value of the elastic limit in the opposite direction. The algebraic range of the two is greatest in the first instance.

Alternate stresses of tension and compression, even below the primitive elastic limits, as such values are commonly defined, when repeated eventually rupture the steel. In such cases there is little or no display of elongation or contraction of area. The speaker thinks he established the fact that destruction of ability to permanently elongate is a phase through which the steel passes preceding the actual rupture of any fibre. If such is the case annealing would be expected to efface some of the effects of the repeated stresses. Annealing has been found to restore toughness to cold worked, embrittled steel.

The moduli of elasticity of steels are lowered in values by rise of temperature.

Coefficients of expansion do not appear to have fixed values, the higher carbon steels notably showing the result of modifying influences.

Cooling strains are difficult to avoid. They are practically unavoidable, in the commercial production of structural shapes. Internal strains in 12-in. steel channels have been measured equivalent to 10,000 lb. per sq. in. tension and in the same member 13,000 lb. per sq. in. compression, a range of 23,000 lb. per sq. in. in all. The futility of attempting to establish a formula for long columns on a mathematical basis, ratio of length to radius of gyration, under such circumstances is quite obvious.

Summary

From these remarks upon the properties of steels we note:

That the value of the modulus of elasticity is a fairly definite quantity, if not disturbed by overstrains or by wide changes in temperature.

That the elastic limits in tension or compression are fixed values in a given steel only under some circumstances.

That elongation in the tensile test means only that displayed under that test, that it has a range in steels from zero upward, that contraction of area ranges from zero to nearly 100 per cent.

That tensile strength has a fairly fixed value according to composition but not according to temperature or treatment, covering a range from zero to above 460,000 lb. per sq. in.

That elongation and contraction of area reduce to zero simultaneously when elastic limit and tensile strength reach their maxima.

That elongation stands a little apart by itself in respect to the display of its maximum value, but under certain conditions of loading it reduces to zero value at atmospheric temperatures in all steels.

That coefficients of expansion may be varied at will

by suitable treatment; it has also been demonstrated that the elastic extension of 1 in. of steel limited to 0.002 in. in the tensile test is capable of displaying an aggregate extension of more than a mile under regulated alternate stresses.

That under cubic compression no finite load has any effect on the physical properties of steels.

That under cubic tension steel is shattered without display of toughness.

That the introduction of internal strains is practically unavoidable.

That such strains in some cases are negligible, in other cases internal strains cause spontaneous rupture of the metal.

These properties are presented in different values and combinations. It is a wise person who can tell what combinations best meet given contingencies. Reliance placed upon an individual test of one type at one temperature, a tensile test or perchance a drop test, puts us into a group of people resembling a one dimension community.

Steel Rails and the Properties of Steel

Reference will be made to the influence of some of these properties on steel rails, selected as a prominent example in the use of steel. When a rail emerges from the last pass of the rail mill, it is given a sweep by the cambering devise to compensate for later changes in temperature. The cambering is done in the plane of the web, and has to do therefore with the relations between the head and the base of the rail. Balanced sections, so-called, are sometimes used, but internal strains are not thereby avoided. The flanges of the base cool relatively quite rapidly, particularly so in the case of thin flanged rails. They acquire a final state of internal compression of higher degree than other parts of the rail. It is customary to find a state of tension at the junction of the web and the base, and also under the head. The peripheral surface of the head, for the most part, acquires a state of compression, the interior of the head a state of torsion. Except in the flanges the strains due to normal rate of cooling are not great. Accelerated cooling by air, oil or water quenching intensifies the internal strains in all parts of the cross section of the rail.

Gagging disturbes the arrangement of the internal strains, even reversing their directions. Strains are not taken out by cold bending, but modified in position and intensity. Unless disturbed by gagging those in the base commonly remain without material change. Cooling strains in the head are less in magnitude than those of the base; in the heavier sections notably less.

It is quite another matter when the rails reach the track. Internal strains are at once introduced by the cold rolling action of the wheels. The intense impinging pressures affect the zone of metal next the running surface. The relative narrowness of the head affords opportunity for some lateral relief to the effects of the wheel pressures, longitudinally internal strains accumulate and reach high values. Internal strains of compression are acquired in the upper zone of the head, which are balanced by strains of tension in the interior. Internal strains in the central core of the head explain the cause of the development of transverse fissures.

Exhaustion of toughness by the cold rolling action of the wheels tends to cause head checks, that is, progressive cracks at the corner of the head, most prevalent on the gage side. Successive hammerings of the web of the rail against the shanks of the track bolts destroy the toughness of the metal and lead to bolt hole fractures.

Split heads, horizontal and vertical, result from the impinging pressures of the wheels. This type of fracture would probably be unknown were it not for the seamy state of the metal. Otherwise lateral flow and mashed heads only would result from excessive impinging pressures omitting reference to transverse fissures. Opportunity for starting a split head depends upon the internal strains encountering a line of weakness in the steel, such as presented by a slag streak. Cooling strains seem adequate to originate a split head fracture, but its extension would depend upon the action of the wheel pressures.

The limiting span of a bridge is reached when the bridge can no longer sustain its own weight. The limit of wheel pressures is reached when no grade of steel can be found that will endure it. That is the crux of the rail problem. It is neither girder strength nor abrasive resistance, but impinging pressures of intensity and volume that control.

A railroad track, obviously, is not the best place available in the study of the physics of materials. Nor is it a place where the finer distinctions may be made in the definition of those properties of steels which possess or at least display differences in durability. According to track reports different rollings and also different heats of the same rolling not infrequently display different degrees of endurance. Early fractures are reported in new rails. Granting that track conditions are variable and not definable with extreme accuracy, careful laboratory examinations of rails, exceptional in their behavior, should throw light upon the cause of their fractures whether due to service conditions or to the steel itself. The users and possessors of the rails, those most familiar with their behavior, are from position best situated to conduct inquiries into the subject of durability, substituting exact information for conjecture.

Such destructive incidents as wheel burning do not involve polemical questions. Intense local heating overstrains the vicinity by compression which reverses to a state of tension when the steel cools, and originates hair line cracks. Possibly there is not a mile of track which does not furnish an example of a rail damaged by wheel burning. Certainly in yards and in the vicinity of stations, wheel burnt rails are of common occurrence.

Thanks to the good qualities of rails, and not the care with which they are used, trains generally pass over such injured track in safety.

Conclusions

In conclusion, practically all grades having been tried and each found breakable, as all steels certainly are, what has been the outcome. Continued increase of wheel pressures. Increase in weight of rails from 100 lb. per yard, with a moment of inertia of say 44, to rails of 200 lb. weight per yard with a moment of 156, diminishes, of course, the fibre stresses under beam action. But such increase in weight is not corrective of intense impinging wheel pressures. Indeed, there are reasons for believing that capacity for receiving internal strains from the cold rolling of the wheels increases with the weight of the rail, tending to offset the benefits of greater volume of metal.

The most promising opportunity to achieve improvement in the rail situation seems to repose in the hands of the users of rails by definitely establishing on their part the relations between physical properties of rails and service conditions in the track.

Refractories Sales Increased but Shipments Fell in November

Shipments of both clay fire and silica brick fell off in November as compared with the month before, according to the monthly report of the Refractories Manufacturers Association. Net new business for the month in both grades, however, showed a gain over October. November shipments of clay fire brick were $31,371,815 9-in. straights, or 61 per cent of the monthly economical producing capacity of the manufacturers reporting, as compared with 35,679,837 in October, equal to 69 per cent of the capacity reporting for that month. New business minus cancellations for November was 33,616,484 9-in. straights, or 66 per cent of capacity, against 33,411,553, or 64 per cent for October. Silica brick shipments in November were 3,474,347 9-in. straights, or 43 per cent of capacity reporting, against 4,186,605, or 52 per cent in October. Net new business in November totaled 5,585,212 9-in. straights, or 69 per cent of capacity, compared with 4,036,175, or 50 per cent, in October. Free stocks, those which could be applied on new orders, were materially reduced in November. Such stocks of clay fire brick, as of Nov. 30, were 70-793,619 9-in. straights, against 75,216,901 a month before, while silica brick stocks in this classification stood at 1,968,111 9-in. straights, at the end of November, compared with 4,056,089 at the end of October.

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Machinery Markets and News of the Works

INQUIRY CONTINUES GOOD

December Business May Equal Any Previous Month of 1924

Louisville Bridge Co. Expected to Enter Market—Nash Motors Co. Buying Drilling Machines

INQUIRY continues active and is from scattered sources. A fair volume of orders was placed during the week and in most districts it is expected that the current month will be among the best of the year. That the new year will develop more business than the year now closing, seems to be the general expectation.

The Louisville Bridge Co. is making a large addition to its shops and is expected to enter the market for punching and shearing machines, also cranes.

Orders were placed during the week by the Nash Motors Co., and the Ajax Motors Co., for several drilling machines and eight shapers. More drilling equipment and some miscellaneous machines will be placed shortly. Recent expenditures by the Nash interests for machine tools are estimated at more than $1,000,000.

Railroad business generally is light in standard machine tools, but there has been some buying of special tools for car repair shops. Action on the small list of the Louisville & Nashville is expected before Jan. 1. The Delaware, Lackawanna & Western is understood to be working on a substantial list. Makers of drills and reamers report considerable inquiry from the railroads.

In the Cleveland district, there has been considerable activity in presses. In Cincinnati engine lathes and planers have been in good demand, a builder of planers reporting orders for 10 machines during the past three weeks.

Export demand shows a slight improvement. The Amtorg Trading Corporation, New York, a Russian purchasing branch, has closed for a wide line of tools, tractors and engines.

New York

NEW YORK, Dec. 22.

PURCHASING of machine tools has declined to the usual holiday level of activity, but additional new inquiries and reports of lists in preparation for next year continue to add to the accumulation of business pending. The basis of much of the present activity is apparently still the railroad demand. In addition to the brief lists of the Lehigh Valley, New York Central and Central Railroad of New Jersey now in the market, the Delaware, Lackawanna & Western is reported working on a substantial list for issue after the first of the year. Makers of drills and reamers report a large volume of inquiry from the railroads and manufacturers of railroad equipment are beginning to evince considerable interest in small and large tools.

Export demand for tools has shown a slight improvement in the past few weeks and scattered purchasing of single tools is noted from South America, Japan and, occasionally, from Europe. One of the outstanding export markets recently has been Russia. The Amtorg Trading Corporation, 136 Liberty Street, New York, a Russian purchasing branch for the United States, has closed on a wide line of tools, tractors, engines, etc. Among recent domestic purchases has been a combination journal turning and axle lathe by the Illinois Central and a 36 in. x 18-ft. lathe by the Stamford Gas & Electric Co., Stamford, Conn.

The New York Edison Co., 130 East Fifteenth Street, New York, will erect a four-story electric power station, 55 x 98 ft., at 308-12 West Thirty-sixth Street, estimated to cost $400,000, with automatic and other equipment. William Whitehill, 709 Sixth Avenue, is architect. Nicholas F. Brady is president.

Cevasco, Cavagharo & Ambrette, Inc., 156 Sixth Street, Brooklyn, manufacturer of macaroni machinery and parts, has plans for a one-story addition, 45 x 100 ft., estimated to cost $32,000. I. Kallich, 375 Fulton Street, is architect.

N. King, 235 Clifton Place, Brooklyn, has inquiries out for concrete block machinery, desiring information and prices.

The American Chamber of Commerce in France, 32 Rue Taitbout, Paris, has received an inquiry (P-2944) from a company at Paris in the market for box-nailing machinery of American manufacture.

Preliminary plans are under way for the construction of a fertilizer plant at Wanganui, near Wellington, New Zealand, estimated to cost $1,000,000 with machinery. The American Consulate, Wellington, has information regarding the project.

The Board of Education, Albany, N. Y., is considering the installation of manual training equipment in its proposed new school to be erected on Delaware Avenue, estimated to cost $800,000. M. T. Reynolds, 100 State Street, is architect and engineer.

Louis A. Sheinart, 194 Bowery, New York, architect, has plans for a four-story automobile service, repair and garage building, 81 x 100 ft., at 204-8 East Ninety-seventh Street, estimated to cost $125,000; also for a similar building, two-stories, 98 x 112 ft., at 304-12 Pearl Street, to cost approximately $80,000.

Manual training equipment will be installed in the four-story high school addition to be erected at Mechanicsville, N. Y., estimated to cost $175,000, for which plans are being prepared by John T. Simpson and Brown Roiston, 31 Clinton Street, Newark, N. J., architects.

The Tokio Municipality, Tokio City Office, Tokio, Japan, has authorized plans for the construction of a steam-operated electric generating station on Tokio Bay, with initial installation of two 5000 kilo-volt amp. turbo-generators and accessory equipment, estimated to cost $570,000. It will replace two smaller stations at Shibuya and Shinagawa, destroyed by the earthquake and is expected to be ready for service in 24 months. The American Consulate, office of the trade commissioner, Tokio, has information regarding the project.

The New York Canners, Inc., Fulton, N. Y., is said to be arranging to rebuild its plant, with power house and machine shop, destroyed by fire Dec. 14, with loss estimated at close to $450,000 with machinery.

The Brooklyn Fire Proof Sash & Door Co., 87-101 Richardson Street, Brooklyn, has plans for an addition, including improvements in the present works, estimated to cost $50,000. Gustave Erda, 826 Manhattan Avenue, is architect.

Fire, Dec. 15, destroyed a portion of the two-story repair works and machine shop of the Borden's Farm Products Co., Inc., Gates and Ralph Avenues, Brooklyn, with loss of $40,000

including equipment. It is proposed to reestablish the plant. General offices are at 110 Hudson Street, New York.

The C. A. Van Dusen Co., Hudson, N. Y., food packer, will proceed with the construction of a one-story power house, 30 x 40 ft., in connection with a five-story addition, estimated to cost $250,000, for which a general contract has been awarded to the Feeney & Sheehan Building Co., 164 Montgomery Street, Albany, N. Y.

The Plaza Metal Bed Co., Brooklyn, occupying a portion of the three-story factory at 5 La Grange Street, Brooklyn, destroyed by fire, Dec. 16, with total loss reported in excess of $75,000, plans for the reestablishment of its works.

The Singer Mfg. Co., Elizabethport, N. J., manufacturer of sewing machines and parts, has plans for a one-story addition, estimated to cost $50,000.

The De Forest Radio Telephone & Telegraph Co., Franklin Street, Jersey City, N. J., has adopted an expansion program to double approximately the present output during the next 60 days, including vacuum tubes and radio sets.

The Newark Novelty & Furniture Co., 127 Morris Street, Morristown, N. J., H. I. Johnson, representative, is considering the construction of a two-story plant, 60 x 200 ft., estimated to cost $40,000 with equipment.

The Western Electric Co., 195 Broadway, New York, manufacturer of telephone and radio equipment, has filed plans for a six-story building and group of adjoining smaller structures, at its new plant now in course of building at Kearny, N. J.

The Liberty Appliance Corporation, Hoboken, N. J., manufacturer of electrical appliances, has leased the three-story factory, 50 x 100 ft., at 306-8 Jefferson Street, for a new plant. Immediate possession will be taken.

The Horni Signal Mfg. Corporation, 153 Frelinghuysen Avenue, Newark, recently incorporated to acquire and develop a business in the manufacture of traffic signals made of steel, aluminum and brass, will be in the market about Jan. 1 for several types of machines. Charles Millbaur is president.

The Versatile Bumper Corporation, 1001 Essex Building, Newark, recently incorporated with $100,000 capital stock to manufacture automotive products, is opening negotiations with manufacturers to have production handled by contract. F. B. Masueri is one of the principals.

The American Production Co., Inc., Holland Hotel Building, Beacon, N. Y., has been organized with $500,000 capital stock to manufacture machinery for converting snow into water. Although present operations are by contract it is planned to erect a factory or purchase one at Beacon. O. T. Bugg is vice-president.

The New Jersey Brass Foundry Co., 346 Washington Street, Newark, N. J., recently incorporated, will manufacture brass composition, nickel and aluminum castings. It is renting a foundry for the present and probably will have some of the work done by contract. New equipment will be required in the near future. J. C. Dowling is manager.

St. Louis

ST. LOUIS, Dec. 22.

CONTRACT has been let by the Vilter Mfg. Co., Finance Building, Kansas City, Mo., manufacturer of refrigerating machinery, to Morley Brothers, Dwight Building, for a one- and two-story plant at 208-14 West Nineteenth Street. Hans Van Unwerth, Finance Building, is architect and engineer.

The Missouri Power & Light Co., Boonville, Mo., has tentative plans for a steam-operated electric power house. O. W. Mattison is general manager.

The Central Milling Co. and the Annex Mining Co., both at Douthat, Okla., affiliated, L. W. Goings, are planning to purchase boilers, oil engines and accessory power equipment.

The Mississippi Glass Co., 4070 North First Street, St. Louis, will proceed with the erection of its one-story addition, 62 x 210 ft., by day labor, estimated to cost $50,000 with equipment. Carey & Esselstyne, Hoffman Building, Detroit, are architects.

The Central Mfg. Co., 712 Braniff Building, Oklahoma City, Okla., contemplates the operation of a plant at 504 South Robinson Street for the manufacture of oil-testing and oiling devices for automobiles. L. J. Milburn is secretary.

The Common Council, Perry, Okla., is planning for the installation of additional equipment in the municipal electric light and power house, including 500 hp. Diesel oil engine, electric generator, and accessories.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in the proposed one-story plant, 55 x 175 ft., to be erected by the National Biscuit Co., 85 Ninth Avenue, New York, at Kansas City, Mo., estimated to cost $250,000.

The Chicago, Rock Island & Pacific Railroad Co., 803 La Salle Street, Chicago, and El Reno, Okla., has awarded a general contract to Joseph T. Nelson & Sons, 3240 South Michigan Boulevard, Chicago, for two shops at its repair works at Shawnee, Okla., to be one and two stories, 115 x 241 ft., and two stories, 124 x 160 ft., estimated to cost $120,000 with equipment. A. T. Hawk is company engineer.

Manual training equipment will be installed in the new high school to be erected at Bartlesville, Okla., estimated to cost $290,000, for which bids are being received on a general contract. J. H. Felt & Co., Grand Avenue Temple, Kansas City, Mo., are architects.

The first unit of the new $175,000 three story reinforced concrete addition to the Chandeysson Electric Co.'s plant at St. Louis, is nearly completed. The addition will be 52 x 360 ft. and is equipped with a 30 ton crane and served by a spur of the Missouri Pacific Railroad, which enters the center of the building. R. J. Paul is one of the principals.

Chicago

CHICAGO, Dec. 22.

PURCHASES by the Nash Motors Co. and its subsidiary, the Ajax Motors Co., remain the leading feature of the market. Additional orders placed by these companies during the week include 50 spindles of high-speed ballbearing drills, eight heavy duty shapers, two special four-spindle drills, two duplex drills. Orders are about to be closed on 50 additional spindles of ballbearing drills, as well as miscellaneous equipment. It is estimated that the recent expenditures of the Nash interests for machine tools exceed $1,000,000. The Miehle Printing Press Mfg. Co., Chicago, has closed for three turret lathes, a 20-in. upright drill, and a planer type milling machine in addition to the 14 tools mentioned a week ago.

Chicago dealers are still receiving an encouraging number of inquiries for single machines from divers sources, but it is probable that general buying will not be actively resumed until after Jan. 1. The Chicago Board of Education is not expected to take action on its inquiries for 24 engine lathes until January. The extensive list looked for from Chicago railroads will probably not be issued before some time in January and possibly not until February. The Vilter Mfg. Co., Milwaukee, is inquiring for a cylinder grinding machine of the twin-cylinder type for grinding cylinders of 2½ to 7½-in. bore.

The Sioux Falls Machine Works, Sioux Falls, S. D., which for the past four years has occupied the rear of a building at 206 North Dakota Street, has taken over the entire structure and has installed additional machine tool equipment.

The Goodman Ice Cream Co., 100 West Forty-fifth Street, Chicago, has awarded a contract for a two-story factory, 34 x 170 ft., at 4500-16 Federal Street, to cost $100,000.

The Joslyn Mfg. & Supply Co., manufacturer of electrical pole line construction material, 3700 South Morgan Street, Chicago, will build a two-story addition, 200 x 230 ft.

The Graham Brothers Truck Co., manufacturs of motor trucks, Evansville, Ind., has awarded contract for three additional plant units, to be known as Nos. 11, 12 and 13, to cost $300,000.

The Water and Light Department, Winona, Minn., will ask bids early in January for a pumping plant in connection with waterworks extensions, estimated to cost $225,000. Alvord, Burdick & Howson, 8 South Dearborn Street, Chicago, are engineers.

The C. A. Dunham Co., 809 Main Street, Marshalltown, Iowa, manufacturer of heating equipment, will take bids in about 10 days for a two-story addition, 50 x 150 ft., with 30 x 50 ft., extension, to cost approximately $100,000 with machinery. H. E. Reimer, Kibbey Building, is architect.

The Marshalltown Trowel Co., 112 South Eighth Street, Marshalltown, Iowa, manufacturer of garden tools, etc., is considering the erection of a one-story and basement addition, 60 x 162 ft., estimated to cost $35,000. J. C. Williams is president.

Bids will be received by the city commissioners, Springfield, Ill., until Jan. 5 for a water-softening and iron removal

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The Crane Market

PURCHASING of cranes is at a low ebb as the year draws to a close. There are a number of large inquiries in the market, however, and a few awards may be made in the last few days of 1924. In the past week locomotive cranes have been slightly more active than electric traveling cranes. The Delaware, Lackawanna & Western, which came into the market recently for five 25-ton locomotive cranes, is reported about to close the business. Power companies seem to provide much of the demand in the overhead field. Pending inquiries are from the General Electric Co., the Phoenix Utility Co. and the New York Edison Co. The Southern Power Co. recently closed on a sizable order of sluice gates with the Newport News Shipbuilding Co., the order including gate hoists. The Indiana Hydroelectric Co., which bought two cranes through Roger M. Freeman, consulting engineer, New York, bought, at the same time, six head gates, two flood gates and a trash gate, all equipped with hoists. The Pittsburgh market showed sustained activity so far as inquiries are concerned and awards in the past week show some gain over those of recent weeks. The Youngstown Sheet & Tube Co. has placed a couple of 15-ton cranes for one of its Youngstown works; a large crane and a charging machine are expected to be let by the Carnegie Steel Co., soon for its Homestead works and a large crane will be wanted for the Memphis terminal and warehouse of the Jones & Laughlin Steel Corporation. There are suggestions, however, that a crane ordered for one of the local plants will be altered and installed at Memphis. Cleveland crane builders report a marked improvement in inquiry and looked for a fair volume of business next month.

Among recent purchases are:

Roger M. Freeman, 3 West Fortieth Street, New York, a 25-ton, 3-motor, and a 25-ton, 1-motor, overhead cranes for the Indiana Hydroelectric Co., from the Whiting Corporation.

Crane Co., Chicago, a 25-ton locomotive crane from the American Hoist & Derrick Co.

Atlantic Coast Line Railroad, Wilmington, N. C., a large wrecking crane, understood to have been placed with the Industrial Works.

Southern Railway, Washington, a 20-ton locomotive crane from the Industrial Works.

Ebner Sons Co., Springfield, Ohio, recently in the market for a crawl-tread locomotive crane has purchased used equipment.

National Biscuit Co., Marseilles, Ill., a 4-ton, 17-ft. span, 2-motor, overhead traveling crane from Alfred Box & Co.

Louisiana Power Co., Monroe, La., a used 12-ton locomotive crane from an unnamed dealer.

Old Dominion Iron & Steel Co., Richmond, Va., one 5-ton, 3-motor overhead crane from the Northern Engineering Works.

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plant at the municipal waterworks, including controllers, valves, operating tables, gauges, etc., and 100,000-gal. steel tank and tower. The Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Manual training equipment will be installed in the new junior high school to be erected at Kearney, Neb., estimated to cost $225,000, for which it is expected to ask bids soon on a general contract. Davis & Wilson, 525 South Thirteenth Street, Lincoln, Neb., are architects.

The Sinko Tool Mfg. Co., Chicago, has awarded a general contract to Ebenholtz & Jorgenson, 1722 North California Street, for a one-story plant on Crawford Street, 95 x 98 ft., estimated to cost $30,000. Melvin A. Nelson, 1720 North California Street, is architect.

Philadelphia

PHILADELPHIA, Dec. 22.

TENTATIVE plans are under consideration by the Philadelphia Rapid Transit Co., 1520 Spruce Street, Philadelphia, for the construction of a car repair shop, at Tenth and Luzerne Streets, to cost $1,500,000.

Henry Levis & Co., Commercial Trust Building, Philadelphia, iron and steel products, have inquiries out for a steam shovel, full crawler type, with 20-ft. dipper stick, high-lift, with boom hoist, about ¾-yd. capacity; also, one 6-wheel saddle tank, 36-in. gage locomotive, about 12 x 18.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has arranged for a bond issue of $12,500,000, the proceeds to be used in part for the proposed 1925 expansion program, including the construction of the first unit of the new steam-operated electric generating plant at Erie Avenue and the Delaware River, and other extensions.

The H. B. Smith Co., Seventeenth and Arch Streets, Philadelphia, manufacturer of boilers, radiators, etc., has plans for a one and two-story and basement factory, 88 x 200 ft., and 50 x 60 ft., at Grays Ferry Avenue and Ninth Street, to cost about $65,000.

The Bureau of City Property, Department of Public Works, City Hall, Philadelphia, plans the installation of a steam power plant in the proposed annex to the City Hall, estimated to cost $5,000,000.

The Foreign Trade Bureau, Philadelphia Commercial Museum, has received an inquiry (43017), from the Oceanic Trading Co., Ltd., 101 Queen Street, Melbourne, Victoria, Australia, Herbert R. Paddle, director, desiring to purchase equipment for a proposed Portland cement mill, to operate on the dry process system, with a capacity of 3000 tons per week, also for power equipment, consisting of three compound engines, one 1500 hp. and two 500 hp., with eight Cornish boilers of special type, provided with mechanical stokers for brown coal fuel and steam-driven blower, electrical plant and accessories; gas engines with gas producer plants using brown coal fuel, with by-product equipment for the production of ammonia, tar, oils, etc., and Diesel engines running on crude oil distilled from brown coal fuel.

The Board of Education, Philadelphia, plans the installation of manual training equipment in high schools to be erected in different parts of the city during 1925, including a senior high school at Nineteenth Street and Hunting Park Avenue, four stories and basement, estimated to cost $2,000,000, for which plans are being completed by Irwin T. Catharine, architect; also for a senior high school, three stories and basement, at Fifty-ninth Street and Columbia Avenue, estimated to cost $1,850,000, for which bids have been asked on a general contract.

A one-story shop totaling 171,000 cu. ft., will be erected at the State school for the deaf, Trenton Junction, N. J., in connection with other buildings estimated to cost $450,000, for which bids are being asked on a general contract until Dec. 29. Arnold H. Moses, Temple Building, Camden, N. J., and Guilbert & Betelle, Chamber of Commerce Building, Newark, N. J., are associated architects.

The American Road Machine Co., Commercial Trust Building, Philadelphia, has awarded a general contract to the William D. Haddock Co., Wilmington, Del., for a one-story addition to its plant at Kennett Square, Pa., 130 x 158 ft., to cost $75,000. It will replace a portion of the plant destroyed by fire several weeks ago.

The Spicer Mfg. Corporation, Reading, Pa., manufacturer of drop forgings, automobile frames, etc., has work under way on a new local plant, to cost $100,000 with equipment.

Fire, Dec. 12, destroyed a portion of the pipe works of the Lebanon Iron Co., Lebanon, Pa., with loss estimated at $75,000 including equipment. Plans are being considered for rebuilding. Headquarters are 1512 Chestnut Street, Philadelphia.

Motors, power equipment, conveying and other machinery will be installed in the two-story and basement printing plant to be erected by *The Pottstown News*, Hanover Street, Pottstown, Pa., estimated to cost $125,000, for which bids are being asked on revised plans. A. S. Kepner, 121 North Hanover Street, is architect; Johnson and Schuyler, Fuller Building, Philadelphia, are associated architects.

The Miller Lock Co., Philadelphia, is in the market for a No. 22 New Britain chucking machine.

The Christiana Machine Co., Manheim, Pa., is inquiring for an open side planer, about 6 x 16 ft., and also a vertical boring mill.

Detroit

DETROIT, Dec. 22.

THE Weiner Cab Co., 447 Ottawa Avenue, Grand Rapids, Mich, has awarded general contract to J. Hermann & Son, Perkins Building, for a two-story and basement addition, 50 x 100 ft., to cost $30,000. Frank P. Allen & Co., Houseman Building, are architects. Nathan Weiner is president.

The Common Council, Hart, Mich., has authorized plans for the construction of a municipal electric light and power house to cost $150,000. Municipal bonds for $62,500 have been approved, and additional funds will be secured by a utility bond sale. Burd & Giffels, Grand Rapids, Mich., are engineers.

The City Council, Kalamazoo, Mich., is planning the installation of additional equipment in the municipal electric plant, including boilers and accessory apparatus, estimated to cost $37,000.

The Ann Arbor Railroad Co., Ann Arbor, Mich., will make immediate improvements in its car shops at Owosso, Mich., with all present steam-driven tools and machinery to be replaced by electric-operated tools.

The Ajax Mill & Lumber Co., Gaylord, Mich., recently organized, is said to be completing plans for the establishment of a local mill, to cost approximately $75,000. W. H. Anderson is president and W. D. Patton general manager.

The Chicago & Northwestern Railroad Co., 226 West Jackson Street, Chicago, plans the installation of loading, hoisting, conveying and other equipment at its coal docks at Escanaba, Mich., for which plans for rebuilding, following a recent fire loss, have been approved. The project will cost $500,000.

Henry W. Middleton and Fred C. Livesay, Adrian, Mich., have acquired a site for a new works for repair and parts manufacture of threshing machines. The new organization will be affiliated with the Rumley Co., Battle Creek, Mich., manufacturer of threshing machinery, etc.

The Boyne City Portland Cement Co., Boyne City, Mich., has been incorporated with $2,000,000 capital stock. Upon completion of organization plans will be prepared for the construction of buildings and installation of equipment. W. H. White is president; L. W. Siegel, secretary-treasurer, and F. B. Gerard, general manager.

Cincinnati

CINCINNATI, Dec. 22.

SOME manufacturers of machine tools report orders in good volume, and from present indications sales this month will be as large as those in October, which was one of the best of the year. While there have been no big orders placed, there has been a fairly large number of orders for single machines booked. Engine lathes and planers have been in good demand, a nearby planer manufacturer reporting receipt of orders for 10 machines during the past three weeks. The General Electric Co. is purchasing tools for its service station at Cincinnati, and the Nash Motors Co. continued its purchases of standard machines.

No action has been taken on the small list of the Louisville & Nashville Railroad, but orders are expected before the end of the year. Railroad business generally is light at present in standard machine tools, but there has been some activity in special tools for car repair shops. The Louisville Bridge Co., which is erecting a large addition to its shops, is expected to enter the market for cranes and punching and shearing machines. Orders from automotive concerns are light, the bulk of the present activity coming from general industrial sources, of which the steel industry is a prominent factor.

The Stanwood Corporation, Cincinnati, has been incorporated with a capitalization of $150,000 to take over the business formerly conducted by the Houston-Stanwood-Gamble Co., Covington, Ky. The property of the latter company was recently sold at receiver's sale to the men comprising the Stanwood Corporation, and it is the intention of the new owners to continue the manufacture of boilers and engines. Officials of the First National Bank, Cincinnati, are the principals in the new company.

The Louisville Bridge & Iron Co., Louisville, Ky., has commenced the erection of an addition, 73 x 360 ft., to cost approximately $50,000. Cranes, punching and shearing equipment will be installed.

The Artcraft Sign Corporation, Lima, Ohio, will erect an addition to cost $30,000. It manufactures electric and other types of advertising signs. When completed the addition will house the porcelain enamel department. R. R. Trubey is president.

The Ohio Steam Shovel Co., Lima, Ohio, recently organized with a capitalization of $100,000, expects to begin manufacturing steam and gasoline operated shovels about Jan. 1. John E. Galvin, president Ohio Steel Foundry Co., is president, and J. D. Rauch, vice-president and general manager.

The Automotive Trailer Corporation, Springfield, Ill., is negotiating for a site for its plant at Dayton, Ohio, through the Chamber of Commerce. It manufactures trailer cars of all types, as well as tractors for industrial plants. S. E. Liedabrand is head of the company.

The Carlyle-Labold Co., Portsmouth, Ohio, manufacturer of vitrified paving brick, is completing plans for new works in the Coal Grove section, Ironton, Ohio, using the site of the former Peters brickyard, to cost $150,000 with machinery. G. E. Carlyle is head.

The Mississippi River Commission, P. O. Box 1017, Memphis, Tenn., will receive bids until Jan. 5 for one hauling and hoisting winch, and one steel ladder for the dredge, H. S. Taber; until Dec. 29 for nine duplex packed piston pumps, and one oil meter, circular 42; and until Dec. 27 for one oil heater and one 2-in. suction duplex oil strainer, proposal 41.

The S. E. Guinn Mfg. Co., 1422 Providence Street, Cincinnati, manufacturer of automatic lighting devices and equipment, has acquired a site on East Maple Street, Johnson City, Tenn., and is contemplating the establishment of a new plant with intention of removing the present factory to this location. Additional machinery will be provided. S. E. Guinn is president.

Benham & Richards, 214 East State Street, Cincinnati, architects, have plans for a two-story automobile service, repair and garage building, 60 x 190 ft., at 518-20 East Broad Street, estimated to cost $105,000. It is proposed to begin work in 60 to 90 days.

The Holston Quarry Co., Inc., Strawberry Plains, Tenn., is planning the purchase of a gyratory crusher, Allis-Chalmers type; also for a number of two-way side dump cars, 36-in. gage, each about 4 yd. capacity, and one 18-ton dinkey locomotive, 36-in. gage.

The Marysville Packing Co., Marysville, Tenn., contemplates the construction of a one-story power house in connection with the proposed rebuilding of its plant, destroyed by fire, Dec. 11, with loss approximating $85,000 including machinery.

The Board of Education, Steubenville, Ohio, plans the installation of manual training equipment in its two proposed grade and high schools, on West Market Street, and at Fourth Street and South Avenue, respectively, to cost about $350,000 and $400,000. Bids on general contract for the first noted will be asked early in January, S. C. Findt, High School Building, Springfield, Ohio, architect. Plans for the last noted school are being prepared by Peterson & Clark, Steubenville Bank & Trust Building.

Buffalo

BUFFALO, Dec. 22.

PLANS are being prepared by the Bos-Hatten Sheet Iron Plate Works, Inc., Buffalo, for a one-story steel fabricating works, 70 x 120 ft. John Bos is president.

The Taggart Brothers Co., Inc., Watertown, N. Y., manufacturer of paper products, recently organized to take over the plants and business of the local company of the same name, will make extensions and improvements in its branch mill at Herrings, N. Y. The company has arranged for a bond issue of $1,250,000, of which about $500,000 will be used at the present time for expansion. B. B. Taggart is president.

The Crane Co., 836 South Michigan Avenue, Chicago, is asking bids on a general contract for a one and two-story factory branch, 105 x 265 ft., at Syracuse, N. Y. Melvin L. King, Snow Building, Syracuse, is architect.

The Madison County Motor Corporation, Oneida, N. Y., has acquired a site for a new two-story service, repair and headquarters building, 90 x 120 ft., to cost close to $85,000, for which it will soon ask bids on a general contract. E. A. Howard, Everson Building, Syracuse, N. Y., is architect.

The North East Electric Co., Rochester, is looking for a 12-in., single spindle Leland Gifford drill press.

The Fuera Bush Concrete Products Corporation, Fuera Bush, N. Y., recently organized with $25,000 capital stock, plans the erection of a manufacturing and curing plant for making building blocks, guard rails and railroad fence posts. J. A. Shultz is president and O. H. Brate, secretary.

Gulf States

BIRMINGHAM, Dec. 22.

THE Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, is said to be planning for extensions in its locomotive and car repair shops at Gainesville, Tex., to cost approximately $200,000 with equipment.

Johns-Manville, Inc., Madison Avenue and Forty-first Street, New York, has leased the buildings of the American Cotton Oil Co., New Orleans, on 5-acre site, and will establish a branch plant, the initial unit to be devoted primarily

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to the manufacture of roofing and asbestos shingles, equipped to give employment to about 150 men. It is expected to begin production early in April.

The secretary of the Sewerage and Water Board, 526 Carondelet Street, New Orleans, will receive bids until Jan. 26 for two 1250-hp. and two 350-hp. motors, with switchboards, cables, instruments and accessory apparatus complete, also for six 24-in. pumps.

The Cordova Brick & Tile Corporation, Cordova, Ala., recently organized, has plans for the erection of new works on a 400-acre tract recently acquired, reported to cost $75,000. Monroe Aaron, Cordova, is president; Jerome Edmundson, First National Bank Building, Birmingham, is secretary.

The Kelso-Wurdock Co., Canyon, Tex., is considering the erection of a one-story ice-manufacturing plant to cost $50,000 with machinery. M. Kelso, general manager.

The Magnolia Petroleum Co., Dallas, Tex., will make extensions and improvements in its pumping plant and distributing station at Corsicana, Tex., estimated to cost $150,000 with equipment.

The Hirsch Brothers Machinery Co., 1901 Bassett Avenue, El Paso, Tex., plans the installation of additional equipment, including lathes for cutting steel bars, drill press, radial drill, boring mill, planer, and other tools.

The United States Engineer, Vicksburg, Miss., is asking bids until Jan. 10 for one 60-hp. internally fired portable tubular boiler, one boiler feed pump, one 3-drum double cylinder hoisting engine, one swinging engine, one lever control, one double-cylinder drum hoist, with two winch heads and two single barrel steam capstans with engines, circular 47.

The South Tampa Electric Co., Tampa, Fla., owned and operated by the United Export Chemical Co., will proceed with the superstructure for a new steam-operated electric power plant. Headquarters of the parent organization are at 476 First Avenue, North, St. Petersburgh, Fla.

Morgan Brothers, Crowley, La., plan the installation of crude oil burning engines and accessory equipment on about 3500 acres near Lake Charles, La., in connection with an irrigation system.

A manual training department will be installed in the new high school to be erected at Cooper, Tex., to cost $85,000, for which a general contract has been awarded to the San Antonio Construction Co., San Antonio, Tex. Phelps & Deweese, San Antonio, are architects.

Horton & Horton, Inc., McKinney and Velasco Streets, Houston, Tex., organized with a capital of $500,000, has plans for the construction of marine ways and a ship repair plant on the ship channel at Cotton Patch Bayou, designed to handle vessels up to 1000 tons capacity. The company will also build loading and unloading wharves, for sand, gravel, etc., electrically-operated. George Horton and R. F. Crawford head the company.

The American Box Company, Edwards Hotel Building, Jackson, Miss., has been acquired by new interests, headed by E. S. Evans & Co. Work will proceed on additions to three buildings at the plant and on one new unit, for which a general contract has been let to the Hayden Construction Co., Milisaps Building, reported to cost close to $100,000, with equipment.

South Atlantic States

BALTIMORE, Dec. 22.

D. C. ELPHINSTONE, 408 Continental Building, Baltimore, machinery dealer, has inquiries out for a 16-in. centrifugal pump, turbine-connected.

Fire, Dec. 15, destroyed a portion of the plant of the King Barrel Co., Cumberland, Md., with loss reported at $30,000. Plans for rebuilding are under consideration. R. E. King is head.

The Fireproof Building Material Co., 1522 Main Street, Columbia, S. C., recently organized with a capital of $50,000, has acquired about 3 acres at Cayce, near Columbia, and will erect a new plant for the manufacture of brick, hollow tile, etc. D. G. Zeigler is president.

The School Board of the City of Baltimore, 1320 Madison Street, plans the installation of a vocational department in the proposed three-story high school to be erected at Thirty-third Street and the Alameda Boulevard, estimated to cost $2,000,000, for which plans are being drawn by Buckler & Fenhagen, 325 North Charles Street, architects. Henry Adams, Calvert Building, is mechanical engineer.

The Norfolk & Western Railway, Roanoke, Va., Clyde Cooke, purchasing agent, will receive bids until Dec. 31, for requirements for wire fencing from Jan. 1-March 31, 1925, contract serial No. AA-333; for requirements for steel springs, same period, contract serial No. AA-335; requirements for locomotive steel tires, same period, contract serial No. AA-334; requirements for couplers and parts, same period, contract serial No. AA-332.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Jan. 6 for 2000 steel balls for the local navy yard, schedule 3071; at the same time for 1400 lb. monel metal for the Portsmouth, N. H., yard, schedule 3072; a quantity of brass and copper tubing for Eastern and Western yards, schedule 3066, and a large quantity of cable and wire for Eastern and Western yards, schedule 3044.

The Atlantic Marble & Tile Co., 203 South Poplar Street, Charlotte, N. C., is considering the construction of a new plant for the manufacture of building blocks, etc., from chipped marble. Presses, rubbing and finishing machinery, drills, etc., will be installed.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for a 750-kw. turbo-generator, three-phase, 60-cycle, 2300 volts, condensing type, with condenser and pumps; also for a steam dryer, about 10 x 28 ft., with capacity of approximately 12 tons per 24 hr., and a filter press.

The United Ice Service Co., Charleston, S. C., operated by Stone & Webster, Inc., 147 Milk Street, Boston, Mass., recently organized under Delaware laws, has concluded arrangements to take over the Carolina Public Service Co., and the Southern Ice Co., Inc., operating six ice-manufacturing plants at Charleston, Columbia, Greenville and Spartanburg, S. C., respectively. It will also acquire the Peninsula Ice Co., Inc., with plant at Far Rockaway, N. Y. Plans are under way for the construction of a new electrically-operated ice-manufacturing plant at Greenville, to replace two existing obsolete units, and for the complete electrification of the present car-icing plant at Charleston. To carry out the work a portion of a preferred stock issue of $1,500,000 will be used.

The general purchasing officer, Panama Canal, Washington, is asking bids until Jan. 9 for a quantity of steel rope and wire, metal moldings and fittings, range boilers, pumps, electric drills, brass sheets and rods, tubing, metallic hose, chain shackles, nails, etc., Panama circular 1646; until Dec. 30 for 1750 lb. spring steel, 6000 lb. staybolt iron, 2000 ft. brass tubing, 900 lb. cold rolled steel, 800 ft. copper tubing, brass bolts, ring bolts, turn-buckles, galvanized unions, etc.

The General Acceptance & Finance Corporation, Flatiron Building, Norfolk, Va., is in the market for dock-loading machinery, including dock tram cars, elevators, etc.

The Pageland Cotton Mills, Pageland, S. C., are arranging for the complete electrification of their plant, including motors and other power equipment. Michael & Bivens, Inc., Gastonia, N. C., is electrical engineer.

The Fruit Growers' Express Co., Munsey Building, Washington, has work in progress on a new car repair and rebuilding plant at Atlanta, Ga., estimated to cost $450,000 with machinery. It will give employment to about 350 operatives. E. J. Roth is general manager.

The Common Council, Highland, N. C., plans the installation of a 200,000-gal. steel tank in connection with a proposed water supply system, for which it is expected to ask bids in January. Warren H. Booker, Charlotte, N. C., is engineer.

The Valdosta Lighting Co., Valdosta, Ga., is arranging a bond issue of $71,000, a portion of the proceeds to be used for extensions and improvements.

R. H. Crummett, Monterey, Va., is in the market for small brass tubing, about 5-32-in. outside diameter, also for larger brass tubing and screw fittings.

Pacific Coast

SAN FRANCISCO, Dec. 17.

THE Fageol Motors Co., Oakland, Cal., manufacturer of automobile equipment, has plans for a one-story addition for which foundations will soon be laid. It will cost approximately $25,000. J. W. De Cou is company engineer.

The Los Angeles Harbor Commission, Los Angeles, is planning the installation of pumping machinery at Fish Harbor to handle the refuse from fish canneries in this section, estimated to cost $20,000.

The Western Power Corporation, San Francisco, operating the Great Western Power Co. of California, with series of hydroelectric generating plants, is arranging for a bond issue of $6,000,000, a portion of the proceeds to be used in connection with the proposed purchase of the San Joaquin Light & Power Corporation, Fresno, Cal., and for extensions and improvements in plants and transmission systems. H. P. Wilson is president.

The Camas Lumber Co., Camas, Wash., is considering rebuilding the portion of its plant recently destroyed by fire with loss approximating $80,000 with machinery. J. O. Storey is president.

Lewis Meunsch, Olympia, Wash., and associates, are completing plans for the construction of a pulp mill at Bellingham, Wash., estimated to cost $150,000 including equipment.

The Paramount Motors Corporation, Azusa, Cal., has awarded a general contract to the Theron Walker Engineering & Construction Co., 714 South Hill Street, Los Angeles, for its proposed plant, consisting of two one and one-half story units, 90 x 300 ft., and administration buildings, 50 x 60 ft., estimated to cost $110,000 with machinery.

The Ventura Refining Co., Oakland, Cal., has awarded contract to Henry J. Christensen, 505 Seventeenth Street, for a new oil storage and distributing plant, comprising three one-story buildings, estimated to cost $80,000. R. Vane Woods, 505 Seventeenth Street, is architect and engineer.

The Northwestern Electric Co., Portland, Ore., is said to be arranging an extension and improvement program to cost $4,000,000 during the coming year, to include the construction of a hydroelectric generating plant on the Lewis River, near Woodland, Wash.

The Roche Fruit & Produce Co., and the C. M. Holtzinger Co., Yakima, Wash., associated, are planning the construction of a joint refrigerating plant and power house in connection with proposed storage plants on North Second Avenue, estimated to cost $150,000 with equipment.

The city purchasing agent, San Diego, Cal., has rejected bids recently received for two electric-operated centrifugal pumps for installation in the University Heights section, and will ask for new bids.

The Shippelhoute Knife Co., 952 Thurman Street, Portland, Ore., has been organized with $51,000 capital stock to manufacture cutlery. It has leased a building and is in the market for machinery. H. C. Shippelhoute is manager.

The San Gabriel Sheet Metal Works, San Gabriel, Cal., organized to manufacture sheet metal products, has started operations in a small way and contemplates building a plant soon. It is now in the market for conductors, elbows, gutters, mitres, etc. Some equipment is needed also for immediate needs. G. A. Whitman is one of the heads.

The Weber Incinerator Co., 1446 West Slauson Avenue, Los Angeles, Cal., incorporated with $30,000 capital stock to manufacture as indicated, will enlarge an established business. An addition to the present plant will be constructed and the company will be in the market for stamping machinery, compressors, mixers, etc. F. L. Foster is one of the heads.

The Schwerin Electrical Appliance Corporation, 1026 Market Street, San Francisco, recently incorporated with capital stock of $200,000, will manufacture outlet flush plates. The company is in the market for molds and machinery for manufacturing glass. W. Henry is secretary.

Archie Ash, Medford, Ore., and associates contemplate the erection of a cold storage and refrigerating plant to cost approximately $100,000 with equipment. It is proposed to proceed with the work early in January.

Indiana

INDIANAPOLIS, Dec. 22.

TENTATIVE plans are being considered by the General Piston Ring Co., 701 Sand Street, Indianapolis, for a one-story branch factory at Tipton, Ind. C. L. Teetor is president.

The Board of Education, Wabash, Ind., plans the construction of vocational shops at the proposed group of high school buildings, estimated to cost $300,000, for which plans are being prepared.

William Michael, Indianapolis, will operate a plant at the rear of 439 West Twenty-eighth Street, for the manufacture of vending machines and parts.

The General Sheet Metal Works, South Bend, Ind., has completed plans for a one-story shop, 60 x 125 ft., to cost $25,000, for which foundations will soon be laid. C. E. Miller, J. M. S. Building, is architect.

The Evansville Planing Mill Co., Evansville, Ind., contemplates the erection of a one-story plant, 120 x 150 ft., estimated to cost $38,000 with machinery. William Johann is manager.

Cleveland

CLEVELAND, Dec. 22.

MACHINE-TOOL inquiry is very active and while orders are light the volume of business is good for December. Most of the purchasers evidently intend to defer buying until next month. Considerable activity has developed in presses. The Fisher Body Co., Detroit, has purchased seven or eight double crank presses and the Willys-Overland Co., Toledo, five or six presses of the same type. Press manufacturers report a 40 per cent increase in inquiry as compared with the recent volume.

A Cleveland manufacturer of turret lathes sold seven machines the past week, all in single orders. A manufacturer of automatic screw machinery reports more inquiries than for several years, ranging from one to a dozen machines. The American Multigraph Co., Cleveland, purchased a vertical and a plain milling machine. In Detroit, automobile companies have taken quotations on a large number of single machines or small lots for replacements but are buying very little equipment this month. The trade looks for some activity on the part of the railroads early in the year, particularly the New York Central and the Pennsylvania lines. The Akron tire manufacturers are buying additional machinery in single units.

The Sterling Brass Co., 9600 St. Catherine Avenue, Cleveland, is planning the erection of a two-story and basement addition, 40 x 185 ft. Allen Sogg, 3030 Euclid Avenue, Cleveland, is the architect and engineer.

The Fanner Mfg. Co., Cleveland, manufacturer of malleable castings and other products, has placed a contract with H. G. Slatmyer & Son for a one-story addition, 70 x 60 ft.

The F. W. Wakefield Brass Co., Vermillion, Ohio, will erect a one-story and part basement brass foundry, 60 x 160 ft. The Austin Co., Cleveland, has the general contract.

The Marvel Equipment Co., 8819 Whitehead Avenue, Cleveland, has placed a general contract with the Dresser-Minton-Scobell Co. for one-story additions, 63 x 80 and 20 x 48, respectively.

The F. Dezort Radiator Co., 10007 Quincy Avenue, Cleveland, has awarded contract for a one-story and part basement factory, 40 x 60 ft. It will be used for welding work.

A manual training department will be provided in a combination grade and high school to be built at Walnut Creek, Holmes County, Ohio. A. S. Hamsher is the clerk of the Board of Education.

A new high school to be built by the Madison Township, Richland County, Ohio, will include a manual training department. Charles A. Dow, Mansfield, is clerk of the Board of Education.

The Forest City Foundry & Mfg. Co., 1220 Main Avenue, Cleveland, has placed contract with H. G. Slatmyer for a one-story addition, 80 x 190 ft. to its Maywood Avenue plant.

New England

Dec. 22.

CONTRARY to expectations, the local machine tool market has become suddenly active. One representative of tool manufacturers says that sales the past week or ten days will bring the total for December up to the second largest month this year. The biggest month was March. A house dealing in used and new equipment reports sales the past week as 100 per cent. Throughout the trade less optimistic yet highly encouraging reports are had. A large percentage of the machinery sold recently will be shipped out before Jan. 1, next, but will not be billed out until after that date. Buying is by a wide range of large and small industries, and in some instances has involved three and four tools on an individual order. Purchases have been of a diversified line of tools, including lathes, of which a 30-in. is the largest, radial drills, vertical shapers, common drilling machines, millers, planers, die punching machines, automatic screw machinery, thread millers, high speed hammers, and bolt cutters, to say nothing of a miscellaneous list of bench equipment.

Stone & Webster, Inc., Boston, has purchased a 75-ton Northern crane for the Luzeren County Gas & Electric Corporation, Humlock Creek, Pa. plant.

Sales of small tools continue comparatively small, but following inventories by metal working plants will, it is believed, become active again.

Mark Spiller & Son, Oakland, Me., axes, is erecting a manufacturing plant.

A permit has been granted Julius Nichelson, 66 Wareham St., Medford, Mass., to build a one-story, 65 x 40 ft. machine shop at 251 Grove St., Waltham, Mass.

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The Dillon Boiler Works, Fitchburg, Mass., will furnish two 84 ft. steam boilers for a one- and two-story, 94x67 power house for the Eastern Steam Laundry Co., 941 Massachusetts Ave., Roxbury, Boston. Lockwood Greene & Co. are the engineers. Other equipment is required.

Work has begun on a one-story plant for the Woburn Degreasing Co., Bedford Street, Woburn, Mass., estimated to cost $100,000 with machinery, to replace a portion of the plant destroyed by fire a number of weeks ago.

The Worcester Stamped Metal Co., Worcester, Mass., will proceed with the erection of a new two-story plant, 40 x 52 ft., estimated to cost about $45,000, with equipment, for which a general building contract recently was awarded. F. E. Billings is general manager.

Power equipment, conveying and other machinery will be installed in the one-story addition, 120 x 145 ft., to be erected at the plant of the Massachusetts Baking Co., 65 East Cottage Street, Dorchester, Boston, to cost $50,000.

The Crane Co., 836 South Michigan Avenue, Chicago, has taken bids for the construction of a one-story addition to its factory branch and distributing works at 115 Front Street, Hartford, Conn. Buck & Sheldon, Inc., 60 Prospect Street, Hartford, is architect and engineer.

The Keystone Mfg. Co., 53 Wareham Street, Boston, manufacturer of metal toys, is said to be planning to purchase one or more motor-generator sets, 10 to 30 hp., capacity, 220-volt, three-phase.

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., is in the market for a used motor generator set, 400 to 500 kw., with synchronous motor, either 440 or 2200 volts, three-phase, 60-cycle; generator, 250 volts d.c., with starting devices and switchboard.

Pittsburgh

PITTSBURGH, Dec. 22.

REPORTS about machine-tool business vary considerably in this district, but the more general is that inquiries still greatly exceed sales. The exception, however, is that of one selling interest the past week who disposed of two pipe machines, two combination punches and shears, a spline miller, a bending machine and an open side shaper. These were widely scattered and represented as many individual sales. Sentiment is cheerful and the expectation is general that 1925 will be a good year, based on the fact that quotations have been made on such a large volume of inquiry. The Carnegie Steel Co. has slightly revised the list of tools recently issued for its Edgar Thomson works.

The American Nickel Co., Clearfield, Pa., has bought an 800-hp. rolling mill motor from the General Electric Co., this motor to replace a steam drive.

The Railway Steel Spring Co., 30 Church Street, New York, is removing its Scott plant at Philadelphia, devoted to the manufacture of wire coil springs, to Latrobe, Pa., where the capacity will be increased.

The Bessemer Gas Engine Co., Grove City, Pa., has tentative plans for a one-story addition, estimated to cost $25,000. Work will begin early in the spring.

The A. F. Thompson Mfg. Co., 118 Eighth Avenue, Huntington, W. Va., manufacturer of gas ranges, heaters, etc., is planning for a three-story addition. A. F. Thompson is president.

The United States Engineer, Pittsburgh, is asking bids until Jan. 14 for the construction of 3 steel barges for river service.

The Atlantic Refining Co., Franklin, Pa., is arranging an expansion and improvement program at its oil refinery during the coming year, reported to cost $350,000, including stack and other work now in progress.

E. H. Norford & Co., Moore Building, Charleston, W. Va., has inquiries out for a motor-generator set, 100 to 150 kw., 250-volt.

The Guyan Machine Shops, Logan, W. Va., machinery dealers, are in the market for a hydraulic wheel press, about 48 in. between strain bars, 250 to 300 tons capacity, motor-driven; also for a 5-hp., 200-volt, three-phase motor.

Milwaukee

MILWAUKEE, Dec. 22.

OF particular interest at this time is the healthy improvement of inquiry received by structural fabricators which gives basis for renewed hopes of a greater activity in the demand for shop equipment. Sales the past week, while of a scattering nature, nevertheless represented a fair volume. Confidence is growing that the new year will develop a much more active trade than the average of 1924.

The Northwest Engineering Works, Green Bay, Wis., manufacturer of crawler type cranes and hoists, loggers' and contractors' equipment, and heavy duty implements, has let the general contract to the Ludolf M. Hansen Co., local, for a one-story brick and steel machine shop extension, 50 x 182 ft., and is now inquiring for miscellaneous equipment. The investment will total about $45,000. L. H. Barkhausen is general manager.

The Nash Motors Co., Kenosha, Wis., which has been making large purchases for its main works as well as the new Ajax Motors Co. plant in Racine, Wis., is about to issue a further list for production equipment for converting the plant of the former LaFayette Motors Corporation at Milwaukee to the purposes of the Milwaukee plant of the Nash which it adjoins at Clement and Oklahoma Avenues. An increase of 25 to 35 per cent in the capacity of the Milwaukee plant will be effected thereby. James D. Austin is works manager.

Peacock & Frank, architects and engineers, 445 Milwaukee Street, Milwaukee, are working on plans for a $150,000 automotive sales and maintenance building, 100 x 120 ft., five stories and basement, at Jackson and Oneida Streets, for a local distributor whose identity is withheld for the present. The general contract has been placed with Bentley Brothers, 808 South Pierce Street, local, who will start work about Jan. 10. Practically an entire floor will be equipped as a machine and service shop.

The West Bend, Wis., Board of Education will close bids Dec. 29 for the erection of a new high school and vocational training institute estimated to cost $300,000 and designed by Foeller, Schober & Stephenson, architects, Green Bay, Wis. F. W. Bucklin is secretary.

The Wisconsin Gas Railway Equipment Co., Oshkosh, Wis., has been incorporated with a capital stock of $150,000 to engage in the business of equipping railroad coaches with gasoline engine power plants. The principals are S. G. Cromwell, E. E. Woodcock, R. G. Aeder and O. E. Woodcock, all of Oshkosh. Operating plans are now being completed but details are not yet available.

The Wisconsin State Highway Commission will close bids Dec. 29 for approximately 465,000 bbl. of Portland cement for delivery during 1925 to various State and Federal aid highway projects throughout the State. J. T. Donaghey is State Highway engineer, Madison.

Canada

TORONTO, Dec. 22.

WHILE demand for machine tools has taken a decided drop the past few days as a result of the holiday season, inquiries are numerous and of the variety that usually turn into sales. The demand for rebuilt equipment has been fairly active and dealers report a good month. Small tools have been moving freely, but a slight falling off is reported for the past few days.

S. H. Kent, City Clerk, Hamilton, Ont., will receive bids until Jan. 5 for the supply and delivery of one 330 g.p.m. vertical centrifugal sewage pump, electric motor and starter. Plans and specifications are with W. L. McFaul, engineer.

The Kimberley-Clarke Co., headquarters at Neenah, Wis., propose to build a pulp mill at Kapuskasing, Ont., to cost approximately $10,000,000. It will have a capacity of 200 tons at the start which will later be increased to 600. Power will be supplied by a development to be made at Smoky Falls, Ont., by the same interests.

Construction will start immediately on the first unit of a $400,000 sawmill at North Vancouver, B. C., for the Capilano Timber Co., Ltd.

It is reported that the White Metal Mfg. Co., Hoboken, N. J., has purchased a site in the eastern harbor industrial area, Toronto, where it proposes to erect a plant to cost $250,000.

William I. Bishop, Ltd., Montreal, has been awarded contract for the construction of the new Lake St. John paper mill for Price Brothers & Co., at St. Joseph d'Alma, Que. It will be completed and in operation by December, 1925.

The Carriage Factory & Automobile Finishing Works, London, Ont., owned by A. B. Greer & Son, corner of York and Talbot Streets, was destroyed by fire Dec. 13 with a loss to building and equipment estimated at $200,000. It is expected that the owner will rebuild.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE, under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.24c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.24c.
Hoops, base price	4.49c.
Bands, base price	3.99c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.34c.
Channels, angles and tees under 3 in. x ¼ in., base	3.24c.
Steel plates, ¼ in. and heavier	3.34c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.20c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.55c.
Toe-calk, ½ x ⅝ in. and larger	4.20c.
Cold-rolled strip, soft and quarter hard	7.00c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	4.15c.
Square, flats and hex	4.65c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	70c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.89c.
No. 12	3.94c.
No. 14	3.99c.
No. 16	4.09c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.45c.	.....
Nos. 22 and 24	4.45c. to 4.60c.	5.10c.
No. 26	4.50c. to 4.65c.	5.15c.
No 28*	4.60c. to 4.75c.	5.25c.
No. 30	4.70c. to 4.95c.	.....

Galvanized

	Per Lb.
No. 14	4.70c. to 4.85c.
No. 16	4.85c. to 5.00c.
Nos. 18 and 20	5.00c. to 5.15c.
Nos. 22 and 24	5.15c. to 5.30c.
No. 26	5.30c. to 5.45c.
No. 28*	5.60c. to 5.75c.
No. 30	6.10c. to 6.25c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—41	—24	⅛ in. Butt	— 4	+19
¼ in. Butt	—46	—32	¼ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap.	—34	— 6	7-12 in. Lap.	— 3	+16

Bolts and Screws

Machine bolts, cut thread, 45 and 10 per cent off list
Carriage bolts, cut thread, 35 to 35 and 10 per cent off list
Coach screws, 45 and 10 per cent off list
Wood screws, flat head iron, 75, 20, 10 and 5 per cent off list

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright, basic	4.25c. to 4.50c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18⅞c. to 19⅞c.
High brass wire	19⅜c. to 20⅞c.
Brass rods	16⅞c. to 17⅞c.
Brass tube, brazed	26⅞c. to 27⅞c.
Brass tube, seamless	23½c. to 24½c.
Copper tube, seamless	24½c. to 25½c.

Copper Sheets

Sheet copper, hot rolled, 22⅛c. to 23⅛c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin			Coke—14 x 20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Prime	Seconds
			80 lb.	$6.15	$5.90
			90 lb.	6.30	6.05
			100 lb.	6.45	6.20
IC	$11.25	$8.85	IC	6.65	6.40
IX	12.85	10.85	IX	7.85	7.60
IXX	14.40	12.55	IXX	9.00	8.75
IXXX	15.75	13.85	IXXX	10.35	10.10
IXXXX	17.00	15.05	IXXXX	11.35	11.10

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits, pig	60c.
Bar	65c. to 68c.

Copper

Lake ingot	16¾c.
Electrolytic	16½c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	9c.
Sheet zinc, No. 9 base, casks	12c. open 12½c.

Lead and Solder*

American pig lead	11c. to 12c.
Bar lead	15c.
Solder, ½ and ½ guaranteed	41c.
No. 1 solder	38c.
Refined solder	32c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	17c. to 18c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.

Old Metals

Prices continue moving upward with demand active. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.50
Copper, heavy wire	11.75
Copper, light bottoms	10.00
Brass, heavy	7.50
Brass, light	6.25
Heavy machine composition	9.50
No. 1 yellow brass turnings	8.25
No. 1 red brass or composition turnings	8.50
Lead, heavy	8.25
Lead, tea	6.50
Zinc	4.25
Cast aluminum	16.00
Sheet aluminum	16.00

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LIBRARY
WEST VIRGINIA UNIVERSITY